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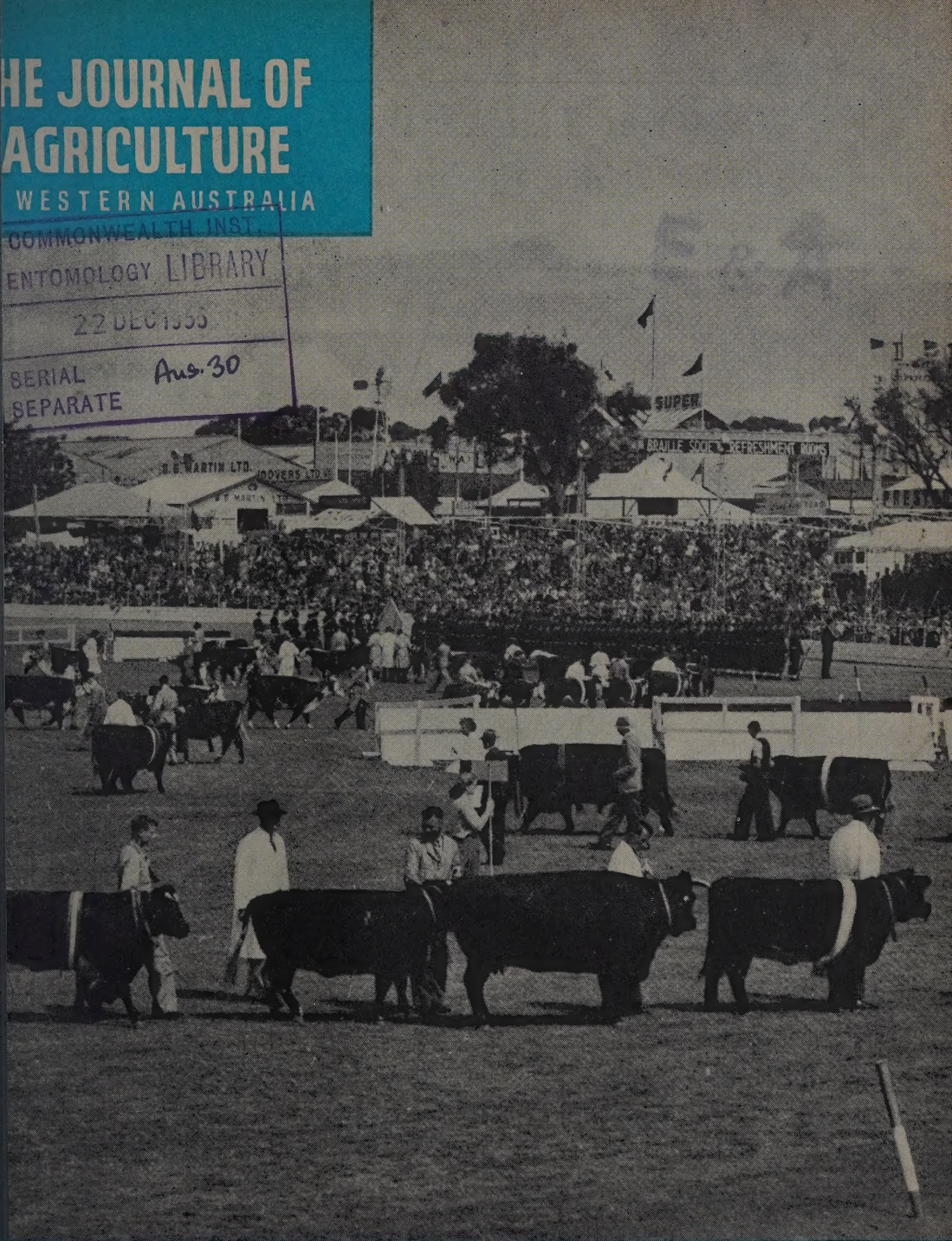

OL. 4 No. 5 (Third Series)

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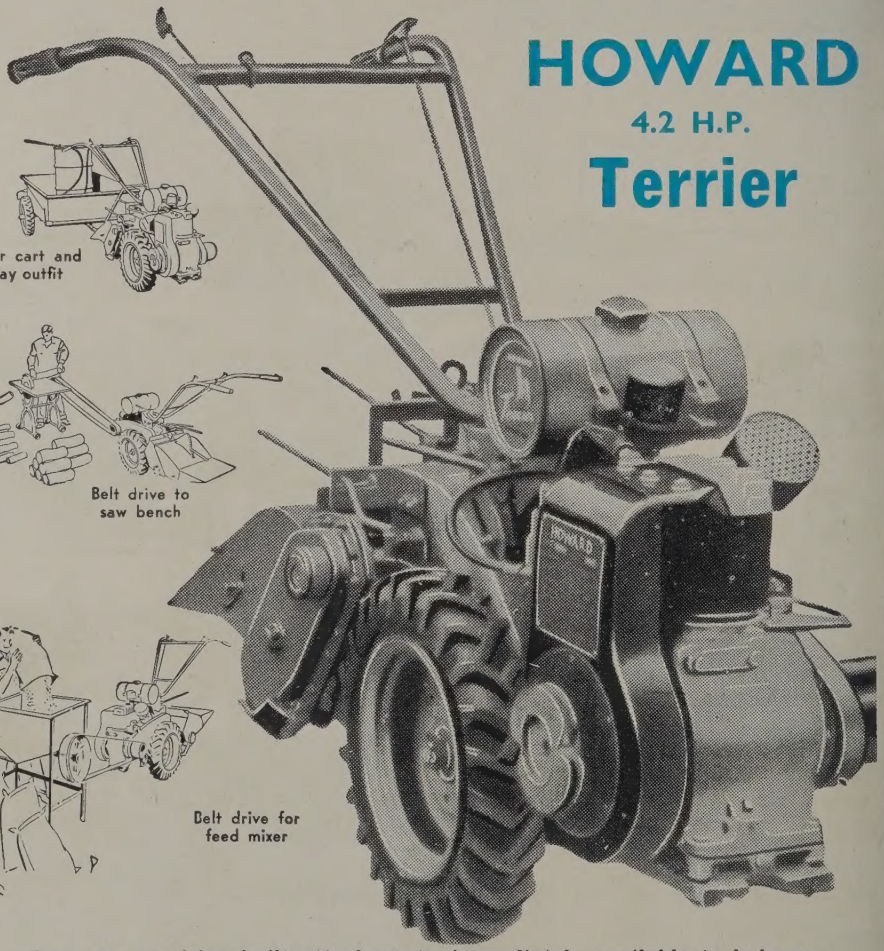

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WESTERN AUSTRALIA

VOL. 4 (Third Series) SEPTEMBER – OCTOBER, 1955 No. 5

Published every second month by the Department of Agriculture, St. George's Terrace, Perth

The subscription rate (which includes postage) is 10s. per annum. Single copies 2s. each.

Edited by J. A. MALLETT

Articles which appear in the "Journal" may be reprinted, provided that the "Journal" and the authors are acknowledged.

Issued by direction of THE MINISTER FOR AGRICULTURE.

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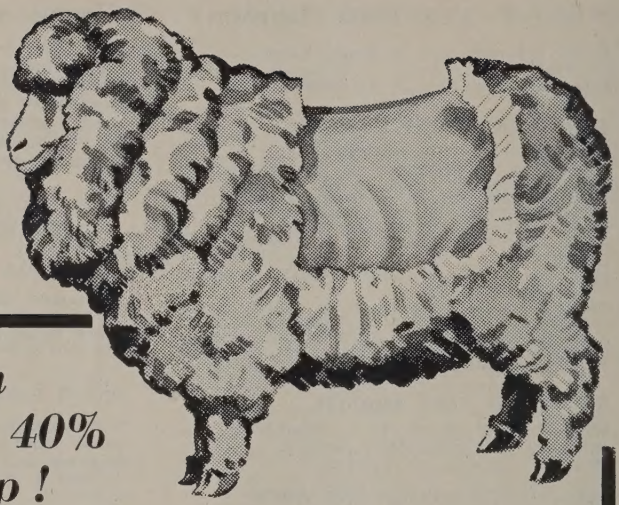

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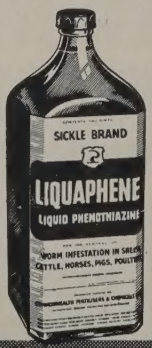

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CLASSING SMALL CLIPS

By W. L. McGARRY, Sheep and Wool Adviser

CORRECT classing of their own clips by the farmers themselves can prove highly educational and definitely profitable. Factors such as labour shortages, inadequate equipment and lack of confidence in their own ability to carry out the work, induce many woolgrowers to leave the classing of their clips to the brokers, but classing of the clip on the farm should be practised wherever possible.

The educational aspect of classing their own wool is important to growers, particularly insofar as it affects flock improvement. By placing the wool in the various bins themselves, growers are not only improving their wool knowledge but are also becoming intimately acquainted with the degree of fault and virtue in their clips. With this knowledge, they are better equipped to select those rams most likely to reduce the faults and add to the virtues.

An intimate knowledge of the **type and quantity** of wool going into the various lines, together with culling, equips growers more reliably and efficiently to select suitable rams than by mere culling alone. This important information can only be obtained at the classing table, and it is obvious also that by classing the wool into the various lines and following up prices realised for the various lots, the grower can readily recognise the most profitable type of wool to produce.

Fig. 1.—The effects of nutrition on the growth of sheep. These two ewes are of the same age and are by the same sire. The one on the left has been well fed throughout its life and has a body weight of 119 lb. The animal on the right has been poorly fed and has a body weight of 54 lb.

QUANTITY AND STYLE

The aim in producing merino wool should be to produce as great a quantity of wool of good style (or character) per sheep as possible. Style is emphasised because in merino wool a premium is paid for style and for this reason the desirability of establishing and improving style is very important and should not be overlooked when striving for quantity.

PRODUCTION COSTS

Production costs are of paramount importance in wool production and one way in which growers can reduce production costs is by increasing the **quantity and style** of wool cut per head of sheep—or in other words by increasing the monetary returns per head of sheep run. Producing cheaper wool means producing more and better wool per sheep.

FEEDING

The amount of wool cut per sheep is governed by two factors. They are nutrition (or feed) and breeding (or inheritance). Of the two there is little doubt that nutrition plays the bigger part in the quantity of wool cut per sheep. Unless

a sheep is on a good level of nutrition from the time it is born it is unable to produce the maximum amount of wool of which it is genetically capable—or in other words it is unable fully to express in wool production its inheritance for this factor. Good nutrition results in the development of more wool-producing follicles during the growth of the sheep, which in turn leads to a greater wool density—or in other words more fibres per square inch of skin. Good nutrition will also make a bigger sheep with a larger skin area on which to grow wool. The more wool-bearing skin on a sheep the better (up to a point) as it has been found that about 90 per cent. of the skin area on a sheep is bare. Thicker and longer wool fibres are grown by the sheep when the nutritional conditions are good and if the millions of fibres that go to make up a fleece are thicker and longer (through nutrition) then the fleece must be heavier.

BREEDING

A stylish wool can be described as a wool possessing to a high degree all those characteristics which wool buyers and wool manufacturers desire and are willing to pay premiums for.

These characteristics are:—

(1) Good staple length.
(2) Robust or thick staple.
(3) Soundness throughout the whole staple length.
(4) Correct staple length for fibre thickness.
(5) Pronounced, regular and even crimp.
(6) Blocky, square tip free from hairiness and fluffiness.
(7) Free and even fibre growth throughout the staple.
(8) Density.
(9) Softness.
(10) Elasticity.
(11) Colour.

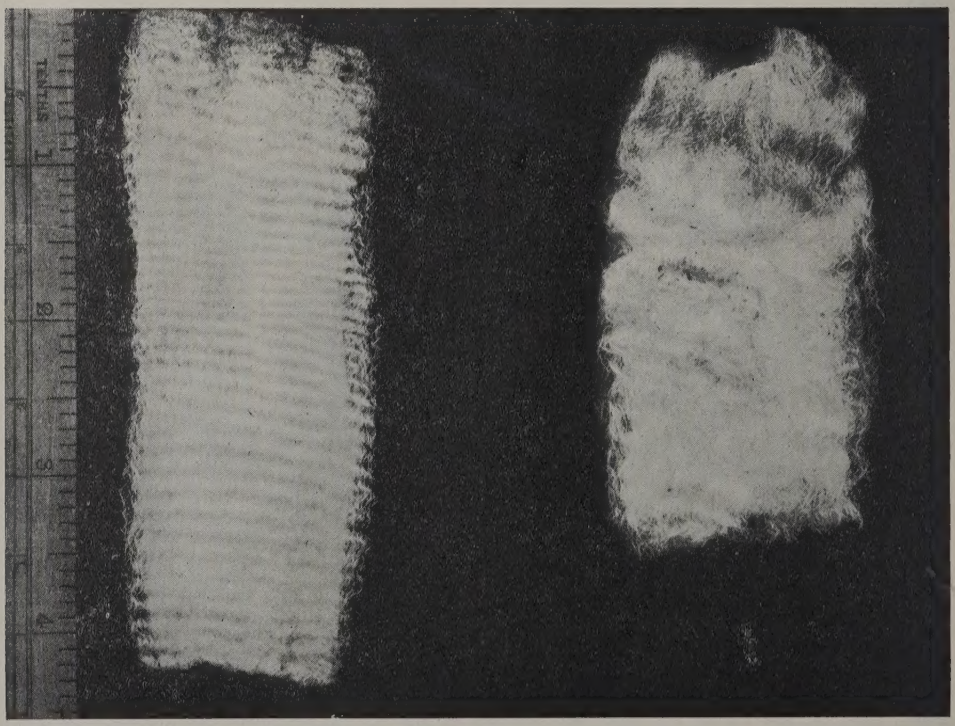


Fig. 2.—Merino wool—strong wool type. That on the left shows good style. That on the right lacks style.

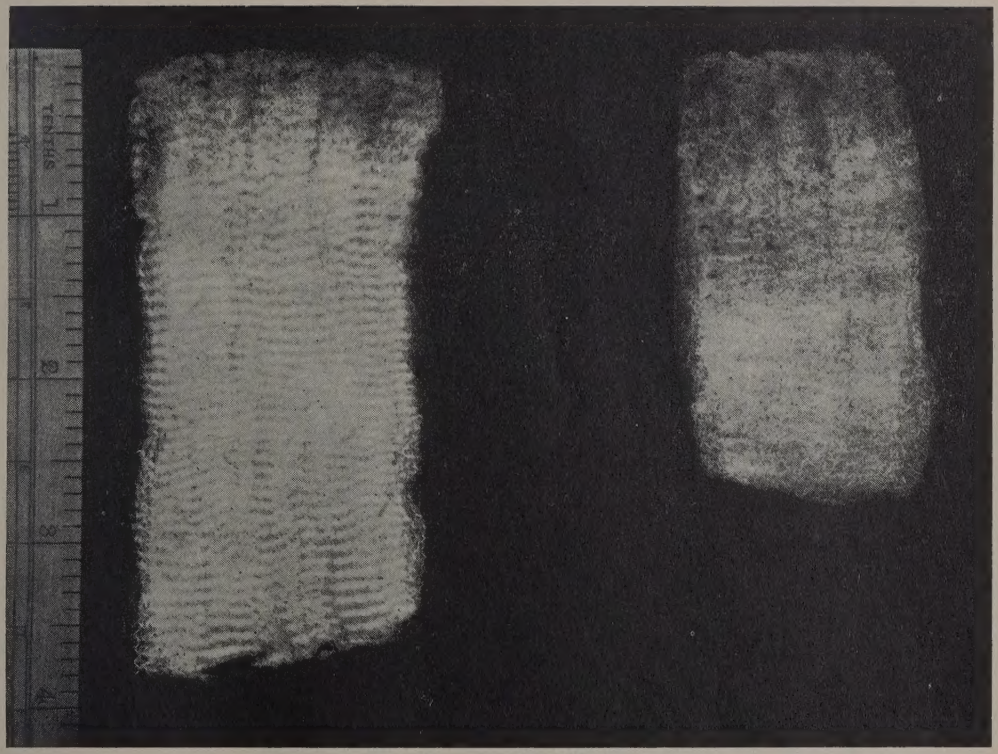


Fig. 3.—Merino wool—medium type. Note the difference between the good style on the left the poor style on the right.

Although nutrition (feed) plays a part in some of these characteristics the main role of nutrition is to produce **quantity** and reliance must be placed more on **breeding and culling** if growers are to establish and retain style in their wool.

In wool growing, feeding and breeding must go together to get the maximum returns. Breeding without feeding is senseless and feeding without breeding is only going half way because a sheep of poor type costs as much to feed and care for as a good one and a good type will convert feed into wool and meat much more profitably than a poor type.

The classing of farmers clips to the best financial advantage is a task that can be performed capably by growers who take an intelligent interest in their sheep and the wool they produce. Classing of such clips calls mainly for the matching of similar fleeces into as few and as big lines as possible out of which must be kept the irregular or "outsort" fleeces which do not match the main lines. The main qualifications required in the correct matching of fleeces are common sense and good eyesight allied to **adequate shed facilities.**

SHEARING SHED FACILITIES

A roomy, well-designed shed is essential if shearing and classing are to be carried out efficiently and expeditiously. Shed space must be laid out economically to ensure the most efficient handling of sheep and wool, and in planning the wool room, it is necessary to aim at a quick, clean handling of the fleeces with the wool travelling in the **one** direction towards the press.

PLAN OF SHEARING SHED

1. A plan of a 4-stand fixed overhead gear elevated shearing shed which is also very suitable for storage purposes is shown in Figs. 4 and 5.

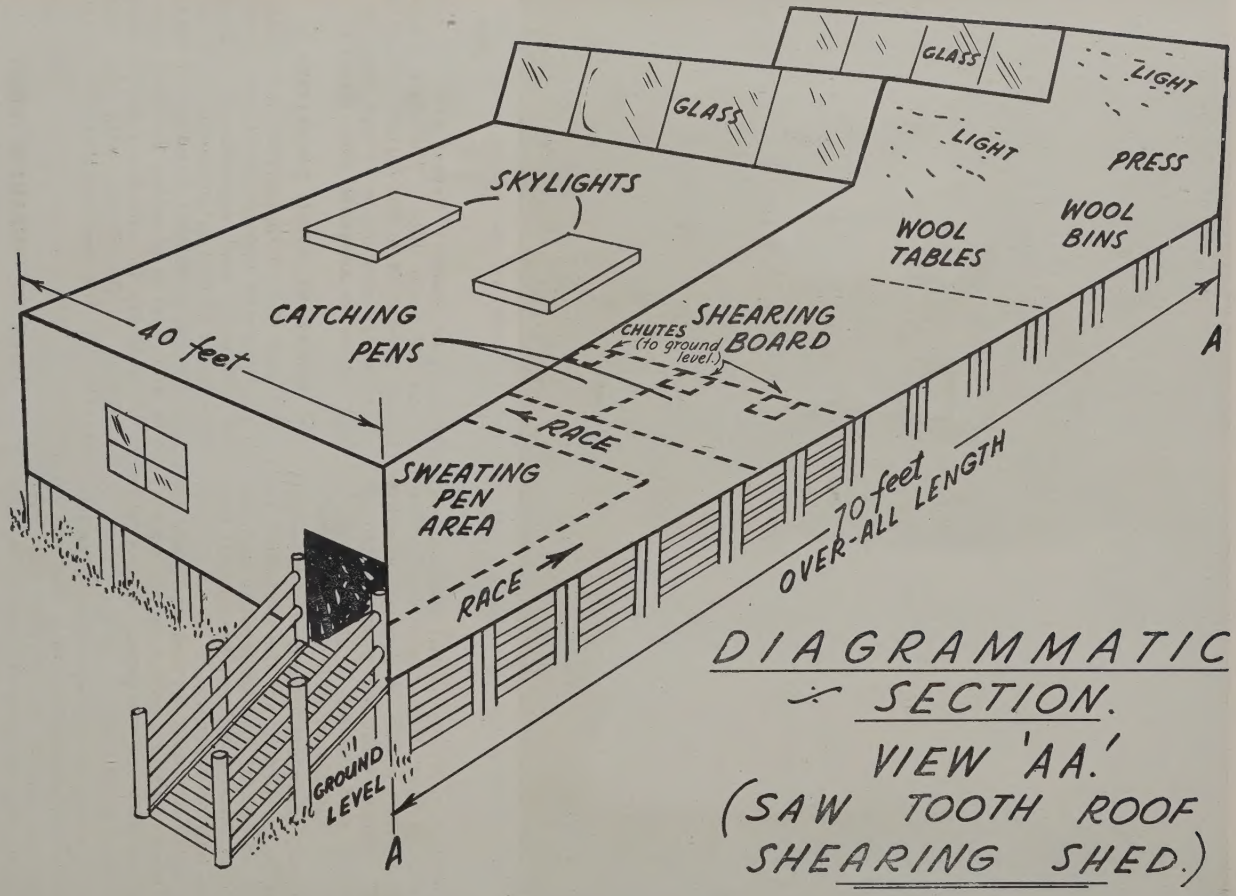


Fig. 4.—A good type of shearing shed.

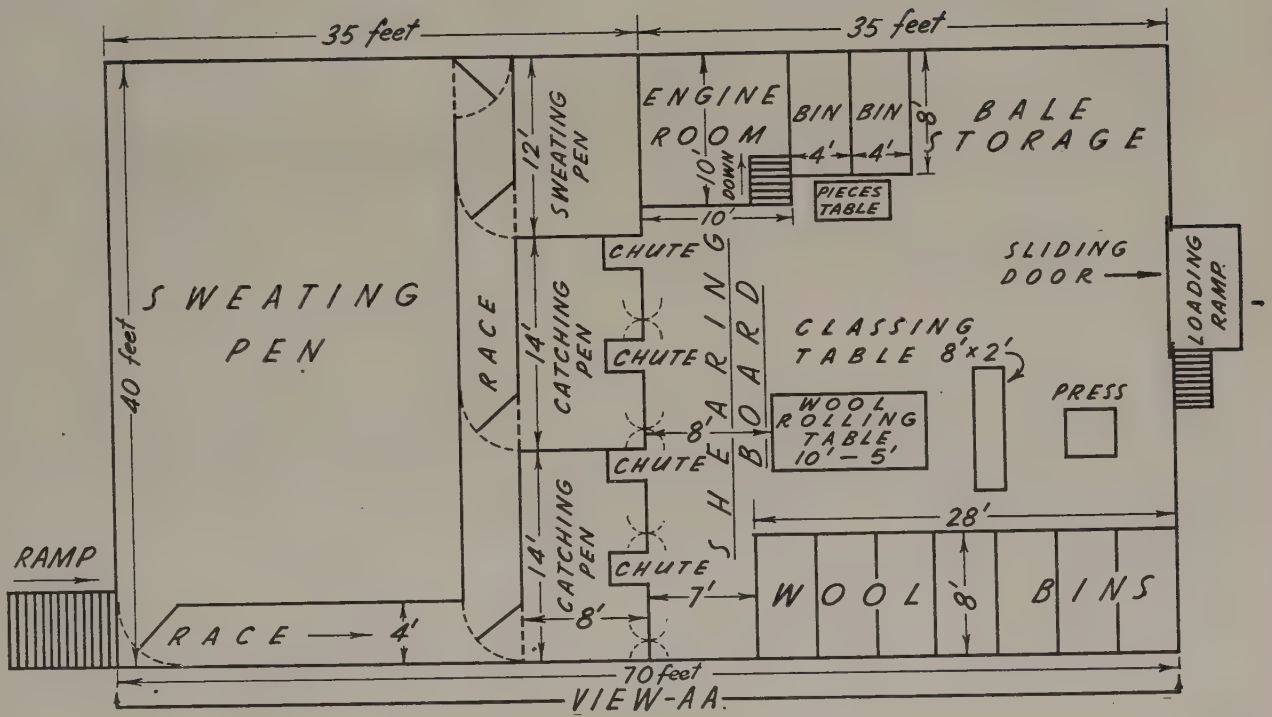


Fig. 5.—Showing ideal lay-out for shearing shed.

This type of shed is definitely preferable to the type where the shearing board is on one side of the shed because it ensures more economical, efficient and easier handling of sheep and wool. This type of shed is recommended for any number of up to eight fixed overhead stands and also two-stand portable plants. The overall measurements, including the catching pens, can be reduced, increased or modified according to the number of stands, sheep space required etc.

2. In this type of shed the sheep do not have to be carried across the shearing board and the shearer does not have to step over the fleece to reach the catching pen. In addition the picker-up avoids excessive walking (or running!) and saves time in handling the wool. By picking up the fleeces and turning around, the wool can be thrown practically straight on to the wool rolling table from the board.

3. The use of frames or gate-type bins in the type of shed shown in plan (see Fig. 6) is recommended and results in considerable space being available for storage after shearing.

LIGHTING

The question of light is very important, particularly in view of the fact that the bulk of shearing is done when days are short and often cloudy.

A good light is essential if the clip is to be classed to the best financial advantage, and in addition a good light enables the classing to be carried out more quickly and easily. Very few shearing sheds in farming areas are sufficiently well lighted to class wool properly, and the question of light seems to be one that is overlooked or ignored by many farmers when constructing their sheds or when arranging their sheds in preparation for shearing. Farmers are not doing justice to their clips or their pockets in preparing their wool for market in a poor light and then subjecting it to the "acid test" of display and valuation under the excellent lighting of a wool showfloor.

Bad light also hampers the handling of the sheep in the shed and is certainly not conducive to good shearing. Sheep will move into lighted pens quicker and with less trouble than if the pens are in semi-darkness, a fault which is applicable to many sheds. When sheep are driven out of strong sunlight into a dark shed trouble is experienced in getting them housed, and this is largely overcome when a shed is well illuminated with natural light.

Factors conducive towards improved lighting in shearing sheds are:—

(1) Installation of saw-tooth type of roofs.

(2) Installation of skylights.

(3) Whitewashing of the inside walls and roofs of sheds. This will improve the lighting considerably at a small cost.

(4) Temporary removal of a few sheets of iron from the roof during shearing—be careful to avoid sun glare, however.

(5) Rearrangement of pens, wool bins, wool tables and shearing board, so that the available light can be used to the best advantage.

(6) Replacing the galvanised iron or board sides of wool bins with wire netting or battens.

WOOL BINS

It is necessary to have at least six bins in the average farmer's flock of 1,000 to 1,500 sheep. In larger flocks more bins are necessary and, in the rush of shearing, more bins mean better classing, more convenience, less work and less double handling. One disadvantage of fixed bins is that they limit the space for storage after shearing. Another drawback is that these bins are generally made the same size, with the result that there is insufficient room for the main lines and too much for the other lines. Fixed bins are usually close-boarded or made with galvanised iron sides, and as a result are generally lacking good illumination. Plenty of light should penetrate each bin to enable the classer to see that the various lines are kept uniform and to permit comparison with neighbouring lines of wool.

Avoid placing wool bins against a wall if possible. If they are arranged so that the presser can obtain the wool from the back of the bin, this will give the presser, classer and other shed workers full freedom of movement without delaying or interfering with their work.

PORTABLE WOOL BINS

The portable or frame type of wool bin (see Fig. 6) is recommended and its advantages are:—

(1) After shearing these can be moved and this allows the use of the maximum storage space for super, grain, etc.

(2) Convenience in small sheds. Frame bins can be easily and quickly adapted to any size required to accommodate the amount of wool going into various lines.

(3) Better light penetration to each bin.

(4) They can be moved or placed anywhere in the wool room during shearing.

Portable bins can be made of light timber (8ft long and 6ft. high) in the form of frames with the uprights fitting into "feet."

Front Uprights—2in x 2in. x 4ft.
Rear Uprights—2in. x 2in. x 6ft.
Bottom Cross Pieces—2in. x 1½in. x 8ft.
Top Cross Pieces—2in. x 1½in. x 8ft. 6in.
Foot Pieces—3in x 2in. x 18in.

It is necessary to cover the frames with wire-netting and this should be stretched tightly across the frame.

GATE-TYPE BINS

Bins made of light timber and affixed to the wall by hinges, gate fashion, are also very suitable. These can be swung back flush against the walls, and out of the way, after shearing and the whole bin space utilised for storage etc.

WOOL TABLES

An adequate wool rolling table is indispensable if the preparation of the fleece for classing is to be done efficiently and expeditiously. The work involved on the wool rolling table is most important, because it is at this stage that the initial, and probably most serious faults occur in the "get-up" of the clip. Half the classing is done if the skirting, backing and rolling is correctly and quickly carried out, and the provision of an adequate wool rolling table is absolutely essential if efficiency and speed in fleece preparation are to be achieved.

Good work is possible only on a table of satisfactory dimensions, and wool rolling tables should be of sufficient length and width to accommodate a fleece that lies flat without it over-hanging the sides or ends of the table.

The **minimum length and width** of a wool rolling table should be 10ft. x 5ft. with batten space ¾in. to 1in. apart. It is

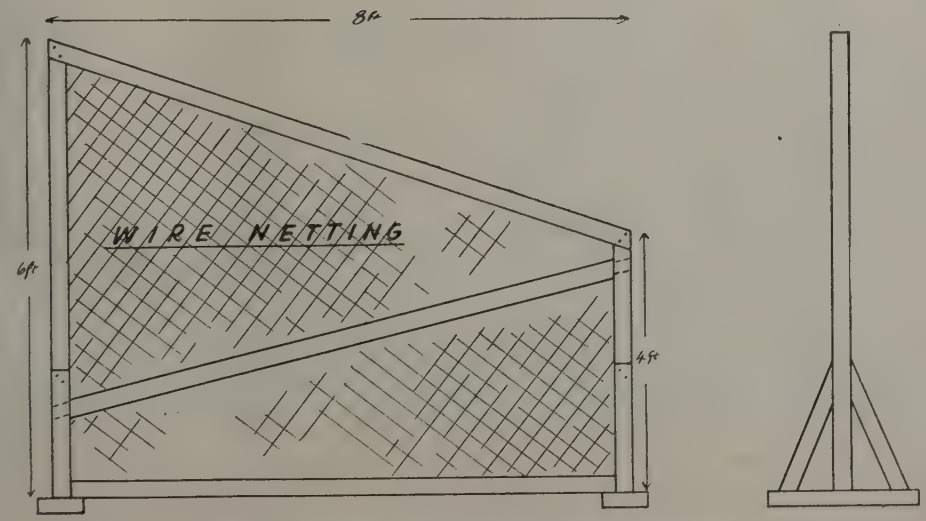


Fig. 6.—This frame type of wool bin has many advantages.

definitely preferable to have a table a little on the large side than to have one on the small side. The majority of tables in use today are too small for good work and could be enlarged to an adequate size at little cost with extensions in the form of flooring boards, or additional battens fixed to the sides and/or ends.

Folding legs or trestles are a definite advantage over fixed legs on a wool table, in that the table can be stored in a minimum of space when not in use.

Wool rolling tables should not be too low or too high—about 3ft. high is ideal for persons of average height. Wool tables that are too high or too low cause unnecessary fatigue. Efficient skirting is impossible if the table is placed against a wall. It is necessary to arrange the table so that the skirter can move around it freely.

Light floor-boards placed around the legs of the table temporarily will keep floor pieces and dags out and save the time involved in shaking these out of the table locks.

ESTABLISHING THE LINES.

The decision as to how the clip is to be classed, what lines to make, etc., has to be made during the first day's shearing, and the importance of the first day's work in setting the lines correctly—or laying the correct foundation on which to class—cannot be over-emphasised. The most difficult part of classing any clip is during the first day, when it is necessary to set out or match together a few fleeces into those lines or grades which are warranted and which are sufficient to cater for the whole clip. It is necessary for the fleeces in these grades to be sufficiently even so that they will blend profitably as a line, and the number of grades or lines must be few enough to enable reasonably big lines to be made in the clip.

It is recommended that the main objective during the first day's shearing should be "to get the eye in" to enable the correct setting-up of the lines to be made. Time spent in this direction is well spent and will eliminate irregular and unprofitable classing as shearing progresses.

Before setting the lines it is a definite advantage to get the "feel" of the clip first, by stacking the first 40 or 50 fleeces in a corner of the shed or in a spare bin as they are shorn—after an examination and handling on the wool rolling and classing tables. These fleeces can be classed out later when the lines have been made. Having a good "look" at the wool in this way before establishing the lines, assists in a correct appraisal of the average quality and type of the wool to follow and assists to "get the eye in" quickly to the correct matching of the next 30 to 40 fleeces into the established bulk lines which will absorb the majority of the clip. Becoming familiar with the wool in this way at the outset eliminates much uncertainty and changing of fleeces afterwards when the lines are being established.

MATCHING

Woolclassing is only another name for the matching into lines of fleeces that are similar in length, quality, condition and soundness, and naturally fleeces that are similar in these characteristics will go together. Matching will be carried out more quickly and more accurately if the classer observes the "golden rule" of all wool work, and remembers that first impressions are the best.

QUALITY

Quality refers to the thickness of the fibre (counts). Merino qualities or counts used are:—

Type.	Quality or Count.
Fine	70's.
Medium	64's.
Strong	60's.
Extra strong	58's.

Do not be concerned with the figures or counts when classing, but be guided by the crimp formation and general appearance and think and class in terms of fine medium, strong and extra strong wool. Narrow crimping denotes fineness and broad crimping, strength, or thicker fibres.

Extra strong fleeces should be kept out of the strong lines. If there is not enough for a bale or line, these types should be baled with other "outsort" fleeces into a mixed bale and sent to broker for bulk classing.

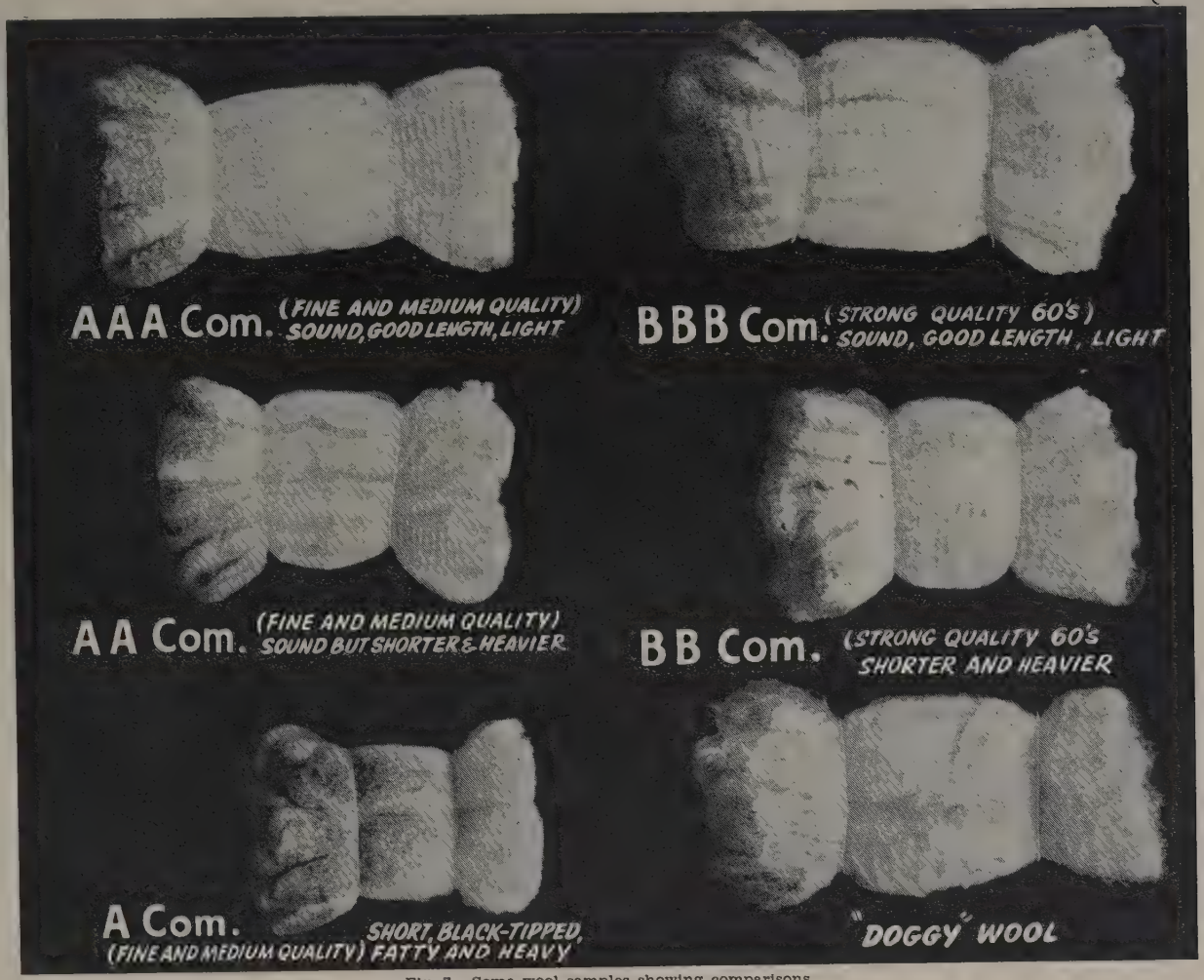

AAA Com. (FINE AND MEDIUM QUALITY) SOUND, GOOD LENGTH, LIGHT
BBB Com. (STRONG QUALITY 60's) SOUND, GOOD LENGTH, LIGHT
AA Com. (FINE AND MEDIUM QUALITY) SOUND BUT SHORTER & HEAVIER
BB Com. (STRONG QUALITY 60's SHORTER AND HEAVIER
A Com. (FINE AND MEDIUM QUALITY) SHORT, BLACK-TIPPED, FATTY AND HEAVY
"DOGGY" WOOL

Fig. 7.—Some wool samples showing comparisons.

DOGGY FLEECES

Doggy wool is illustrated in Fig. 7. This objectionable and nondescript type of wool is straight-fibred, characterless and shiny, lacking in breeding and with poor felting and spinning properties.

Keep doggy fleeces out of **all** fleece lines and include with other outsort fleeces in a mixed bale for bulk classing.

OUTSORT FLEECES

Outsort fleeces embrace all irregular, inferior and odd fleeces which will not match the main lines: the value of which is lowered if they are left in. Outsort fleeces include the matted, very discoloured, doggy, heavy black tipped, rotten, extra strong, heavy and fatty, very short types etc.

All outsort fleeces should be baled together and sent to brokers for bulk classing.

BULK CLASSING.

The bulk classing departments in brokers stores are designed to handle outsort fleeces to the best financial advantage. Bulk classing was instituted principally to deal with mixed bales, lightweights and bags which previously were bought by dealers, usually at a discount.

Many bins are used in order to cover all types and colours of wool and, from a mixed bale, possibly a dozen different sorts are made—the owner being credited with the weight which has gone into each of the different bins.

Large lines of bulk-classed wool meet with good competition at sales and provide the medium for growers' small and irregular lots to enjoy full competition and realise full value.

LENGTH

This refers to the average length of the staple and when classing merino wool it is necessary to think and class in terms of:—

Good Length 3½in to 4in. (Warp).
Medium Length 2½in. to 3in. (Half Warp).
Short, Under 2½in. (French Combing).

In years when seasonal conditions are good, warps (bulk top lines) naturally will be plentiful. However, when the clip is not well grown all the wool will be correspondingly shorter in staple and the half-warps would be the bulk top line.

CONDITION

This refers to the amount of yolk, etc., in the wool and it is necessary to differentiate between light, medium and heavy variations in condition. When classing, it is necessary to lift the fleece off the classing table to arrive at a reliable estimation of its condition. Do not be misled by colour when estimating condition. A bright fleece is not always light-conditioned and a fleece that is "off colour" (not bright) is not always heavy-conditioned.

All fleeces with a pronounced heavy black tip and heavy fatty fleeces must be kept separate and not included in the medium conditioned lines.

SOUNDNESS

This refers to the tensile strength of the fibre which is subjected to tension during the combing process. This strain is about equal to a 7 lb. tension on the average staple of wool. Sound wool will withstand this approximate 7 lb. pressure when applied by hand. Unsound or tender wool will give or break under the strain. Incon-

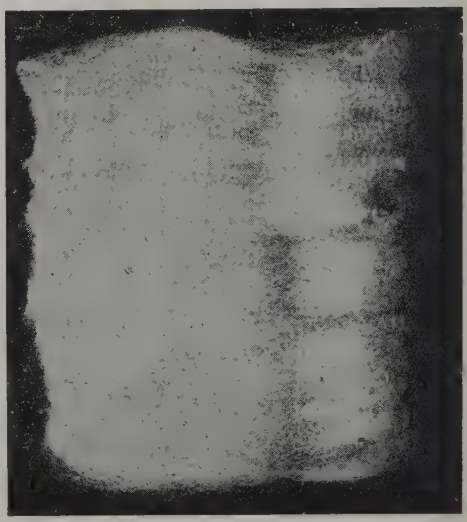


Fig. 8.—Tender wool. Note break when subjected to tension.

sistency and errors of judgment will occur when testing wool for soundness, unless the same tension is applied to the same thickness of staple for each fleece.

To test for soundness, grasp the tip of staple between the thumb and forefinger of the left hand and the butt of the staple between the same fingers of the right hand, and apply steady pressure of about 7 lb. Keep all tender fleeces out of the main sound lines. If there are not enough tender fleeces for a bale or a line, bag them or make a mixed bale with other "outsort" fleeces for the bulk class.

If the big majority of the fleeces in a clip are tender, ignore this factor and class on quality, length and condition.

PICKING UP AND THROWING

If the fleeces are picked up and thrown correctly, the whole "get-up" will benefit because the fleeces can be skirted much more efficiently and expeditiously when they are thrown so that they lie flat on the table.

A little time and trouble spent by the picker-up in this important aspect of shed work is reflected in better work and better classing throughout the shed. A little attention to straightening and disentangling the points of a fleece as the shearer is finishing the last few blows can, and does often, mean the difference between good and bad throwing, and consequently good and bad skirting and backing.

Frequent use of the broom should be made by the picker-up to avoid dags, second cuts, sweaty ends, etc., from the previously shorn sheep being gathered into the fleece as it is picked up.

SKIRTING AND BACKING

Maximum returns are dependent upon efficient skirting and it is essential that fleeces are carefully skirted for sweat, stain, seed and burr, and also any rough breech pieces. Discretion must be used as to the depth or amount of skirting necessary. The volume of skirtings removed can vary with seasonal conditions, which govern the amount of seed and/or burr, dust and foreign matter in a fleece.

Careless or faulty work at the wool-rolling table can result in over skirting, which is definitely unprofitable. Over skirting builds up the piece lines at the expense of the more valuable fleece lines—in other words, it **increases** the quantity of **lower** priced wool and **decreases** the quantity of **higher** priced wool.

When skirting, it is recommended that all breech skirtings be thrown in a basket handy at the end of the table; separate from the rest of the skirtings. This will facilitate piece picking in that any rough breech skirts and stains are automatically separated from the rest of the pieces.

Those portions of the back and neck wool which are too thin, short, dusty, etc., to match the rest of the fleece, should be removed, and inspection on the rolling table with the tip side up is essential to determine the degree of backing necessary. Indiscriminate removal of backs and necks is unprofitable and results in much wool which could have been typed as fleece, being relegated to a broken type at a lower value. Profitable classing calls for as much fleece wool in a clip as possible.

When backs are removed and a line is made, this wool must be kept separate and branded BKN.

WOOL ROLLING

Neat, compact, well-rolled fleeces with the shoulder wool wrapped around the fleece have definite advantages lacking in slovenly and carelessly-rolled fleeces. These advantages are:—

(1) The wool opens up more attractively on the showfloor.

(2) Handling is facilitated when carrying to the bin and when pressing.

(3) **A greater degree of consistency and evenness in the classing and** better distinction between the lines is facilitated.

Rolling should be done by folding in one-third of the fleece lengthways, then fold the doubled portion to the outer edge. Then roll firmly but not too tightly from the breech to the neck.

PIECES AND BELLIES

Pieces and belly lines in **all** clips should be free of urine stains, second cuts and locks. It is not advisable to make more than one line of pieces and bellies in small clips, but in larger clips two lines can be made where warranted.

Very heavily seeded pieces and matted jowls should be kept out of **all** piece lines. Bag separately if not enough for a bale.

Pieces should be shaken thoroughly to eliminate locks and second cuts. Piece lines that are locky will go down in type, yield and value.

LOCKS AND STAINS

At the present high levels these types warrant more attention than they usually receive. The stained piece line should take only urine and dung stains from the breech end of fleeces, together with belly pizzle stains. If the stained content is heavy due to lack of crutching, lush season, etc., breech skirtings should be trimmed carefully, because the presence of over much clean wool in stained piece lines is unprofitable, and, conversely, clean piece lines containing stains will be reduced in value as a result of this fault.

Locks should be shaken in order to eliminate dags and pieces. The inclusion of dags results in the paying of freight on something that is worthless, and the pieces will bring more money if included in the piece line.

LAMBS

Only one line should be made in small clips, but where warranted two lines can be made for larger clips—grading merino lambs for length and aiming at a good distinction. Remove all urine and dung stains.

BRANDS

Where woolbrand fault is excessive and prevalent, the brand should be removed and bagged separately from the other wool. When brands are completely removed it is advisable to notify the broker accordingly.

DOWNS TYPE OF WOOL

As most of the Downs wool types carry brown, black or grey fibres, it is important that it is not mixed with any other wool. Wool of this type should be branded according to breed and bagged if there is insufficient for a bale. Where growers of fat lambs of the Downs breeds have a number of unfinished lambs left on their hands that are shorn at the general shearing, the wool when shorn should be kept strictly apart from other wool, and placed into bales or bags without skirting.

NUMBER OF LINES TO MAKE

The number of lines made is dependent upon the size of the flock and the amount of wool to be handled. Lines as big as possible should be made and overclassing should be avoided. Under present conditions, experience indicates that a few big lines of fleece wool that are reasonably even, are somewhat more profitable than a number of small lines. In these bulk lines, the top fleeces "carry" the average fleeces with the result that generally a higher **average** price per lb. results than if the wool had been classed out closely into smaller and probably more uniform lines.

To receive full advantage of classing in this manner, however, **great care must be taken to keep out of the bulk lines the odd irregular fleeces that do not match.**

When setting or establishing the lines, do not set the standard of the top line too high, set the standard according to the wool before you and not on the previous year's clip and have a good distinction between the tops and seconds. **Make plenty of top line** even if it is not as good as you would like—the second line will, by comparison, be correspondingly inferior in appearance and lower in value if the lines have been soundly established. Big top lines are not possible if the standard is set too high at the commencement of shearing. Big top lines are profitable and **increase the average price per lb. over the whole clip.**

The average price per lb. is more important than the individual price per lb. for various lines, and it is **the** important factor as far as total cash returns are concerned.

DESCRIPTION OF LINES

Lines can be made from the following descriptions:—

Because a description is shown it does not necessarily follow that every clip has wool, or wool in sufficient quantity, to fit this description, and it can therefore be eliminated if considered advisable.

MERINO FLOCKS OF UP TO 1,500 GROWN SHEEP

Brand—

AAA COM—Good length, sound, light condition, **fine to medium** quality.

AA COM—Shorter, sound, heavier in condition, **fine to medium** quality.

BBB COM—Good length, sound, light to medium condition, **strong** quality. (Exclude extra strong, straight fibred and doggy fleeces.)

AAA FLC—Tender. Contains all fleeces out of previous three lines that are tender.

COM B/C—Takes all inferior and irregular fleeces that will not match the previous four lines. (See notes on outsort fleeces.) Bale fleeces together into a mixed bale and consign to broker for bulk classing. Most of these fleeces will come from culls and it will make classing easier if the culls are drafted off and shorn separately.

(It is essential to make this line in every clip.)

AAA BKN—Backs.

AAA NKS—Necks (if warranted).

AAA PCS—Longest and lightest pieces. Stains removed. Keep heavily seeded pieces and matted jowls out. Keep locks out of pieces.

AA PCS—Shorter and heavier (if warranted).

AAA BLS—One line. Pizzle stains removed.

STD PCS—One line. Dags removed. Contains only urine and dung stained pieces. Dry before pressing.

LKS—One line. Dags removed. Keep pieces out of locks.

AAA LBS—Longest and lightest. Urine stains removed.

AA LBS—Shorter and heavier (if warranted). Urine stains removed. Odd fleeces from rough, hairy tipped and late dropped lambs (very short) to be blended through with LKS.

CRT—Crutchings. One line minus dags.

MERINO FLOCKS OF OVER 1,500 GROWN SHEEP

Lines can be made from the following descriptions:—

Because a description is shown it does not necessarily follow that every clip has wool, or wool in sufficient quantity, to fit this description, and it can therefore be eliminated if considered advisable.

Brand—

AAA COM—Good length, sound, light condition, **finer** quality of clip.

AA COM—Shorter, sound, heavier in condition, **finer** quality of clip.

A COM—Very short and heavy in condition, **fine and medium** quality of clip.

AAA—Good length, sound, light condition, **medium** quality of clip.

AA—Shorter, sound, heavier in condition, **medium** quality of clip.

BBB COM—Good length, sound, light condition, **strong** quality of clip. (Exclude extra strong, straight fibred and doggy fleeces.)

BB COM—Shorter, sound, heavier in condition, **strong** quality of clip. (Exclude extra strong, straight fibred and doggy fleeces.)

BBB—Attractive fleeces of **extra strong** quality. (Keep straight fibred and doggy fleeces out.)

AAA FLC—Tender, average to good length, **medium and fine quality.**

AA FLC—Tender, shorter and heavier, **medium and fine** quality.

BBB FLC—Tender, **strong** quality. (Exclude doggy fleeces.)

COM B/C—Takes all inferior and irregular fleeces that will not match the main lines. (See notes on outsort fleeces.) Bale fleeces together into a mixed bale and consign to broker for bulk classing. Most of these fleeces will come from culls and it will make classing easier if the culls are drafted off and shorn separately.

(It is essential to make this line in every clip.)

AAA BKN—Backs.

AAA NKS—Necks (if warranted).

AAA PCS—Longest and lightest pieces. Stains removed. Keep heavily seeded pieces and matted jowls out. Keep locks out of pieces.

AA PCS—Shorter and heavier (if warranted).

BBB PCS—Contains rough quality pieces and breech ends.

STD PCS—One line. Dags removed. Contains only urine and dung stained pieces. Dry before pressing.

LKS—One line. Dags removed. Keep pieces out of locks.

AAA BLS—Longest and lightest. Remove pizzle stains and trim **lightly.**

AA BLS—Shorter and heavier. Remove pizzle stains.

AAA LBS—Longest and lightest. Urine stains removed.

AA LBS—Shorter and heavier. Urine stains removed. Odd fleeces from rough, hairy tipped and late dropped lambs (very short) to be blended through with LKS.

AAA CRT—Longest and lightest crutchings. Remove stains and dags.

AA CRT—Shorter and heavier crutchings. Remove dags.

COMEBACK AND CROSSBRED FLOCKS.

It is stressed that in classing Crossbred wool, quality, or fibre thickness, is the most important factor to keep in mind.

Crossbreds are graded and described as follows:—

Type.	Brand.
Comeback	CBK Finest
Fine Crossbred	F XB Fine Crossbred.
Medium Crossbred	M XB Medium Crossbred.
Coarse Crossbred	C XB Coarse Crossbred.

In mixed flocks, i.e., crossbred and merino, classing will be more efficient and made much easier if the sheep are drafted in the yards before shearing and shorn separately.

Lines can be made from the following descriptions:—

Because a description is shown it does not necessarily follow that every clip has wool, or wool in sufficient quantity, to fit this description, and it can therefore be elminated if considered advisable.

Brand—

AAA CBK—Good length, light to medium condition, Comeback (fine) wool.

AA CBK—Shorter and heavier condition, Comeback (fine) wool.

AAA F XB—Good length, light to medium condition, fine Crossbred wool.

AA F XB—Shorter and heavier, fine Crossbred wool.

AAA M XB—Good length, light to medium condition, medium Crossbred wool.

AA M XB—Shorter and heavier, medium Crossbred wool.

C XB—Good length, light to medium condition, all coarse Crossbred wool and long English breeds.

XB B/C—All cotty, discoloured and cast fleeces into a mixed bale for Bulk classing.

AAA CBK FLC—Tender Comebacks.

AAA XB FLC—Tender Crossbreds.

CBK PCS—Comeback and fine Crossbred pieces.

XB PCS—Medium and strong Crossbred pieces.

CBK BLS—Comeback and fine Crossbred bellies.

XB BLS—Medium and strong Crossbred bellies.

XB STD PCS—One line, CBK and XB stains together, minus dags and dry before pressing.

XB LKS—One line, CBK and XB Locks minus dags.

CBK LBS—Comeback (fine) lambs (two lines if necessary, according to length).

FM XB LBS—Fine and medium Crossbred lambs (two lines if necessary according to length).

XB LBS—Coarse Crossbred lambs.

PRESSING AND BRANDING

Neat, well-pressed bales facilitate handling, save packs and are a general all-round advantage. When pressing, it is advisable not to make the bales containing top line wool too heavy. It is an advantage also if the weights of such bales are kept fairly even and without a great variation in poundage. The conservation of wool packs is an important item at the present high price for packs, and a reasonably high overall bale average is necessary in order to conserve packs. This can be effected by increasing the weights in the lower or inferior lines, which will not lose anything in appearance when opened up, through heavy, but not excessive bale weights.

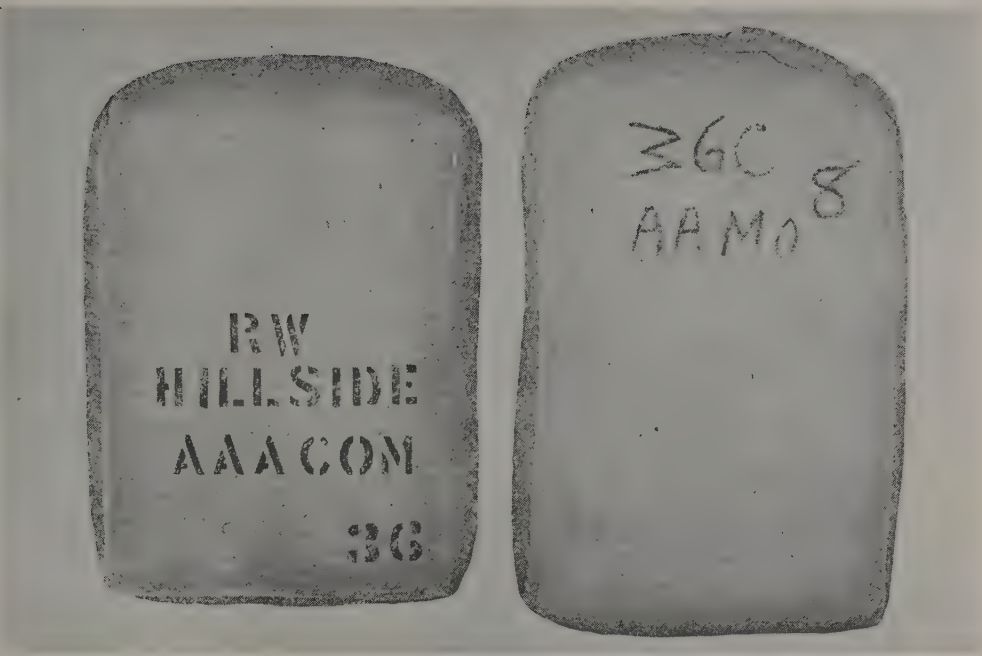


Fig. 9.—Left—A correctly branded bale. Compare with badly-branded bale on right.

Fig. 10.—Cap of a correctly branded bale.

The bales in the clip must be numbered consecutively from number one on to the end of the clip with oddments following in sequence. Do not duplicate numbers in any one season.

It is recommended that a plain brand which is distinctive and bold be used with the owner's initials over the name of the property. The initials serve as a distinguishing mark as many farm names are duplicated. Stencil plates only should be used, and the letters on these should not be too small. Do not use horse, cattle, wool brands, etc.

The brand, description and bale number should be clearly marked on the front and top of each bale. Do not brand on the bottom of the bale as this is required for shipping marks. **The front of the bale should be the side with the seam all round.** Where no mechanical press is available and fixed top packs are used, the same method applies, but the **front** of the bale should be opposite to the side to which the cap is attached.

The minimum weight of a "full weight" bale of greasy wool (other than lambs' wool) is 225 lb. Bales weighing less than this are treated by brokers through their bulk-class department.

It is **most essential** that the classer or grower sends the wool broker a brief report on the clip, immediately shearing is finished, giving the bale number of any "splits" in the flock and stating where and at what bale number a change has occurred in the wool. This could occur through a change in country, a different paddock, or a change of flock during shearing.

This report assists brokers considerably in displaying and cataloguing clips to the best advantage prior to sale.

Book Review.

"FERTILITY AND INFERTILITY IN THE DOMESTIC ANIMALS"

(J. A. Laing)

THIS is a book that is particularly well-presented and most up-to-date. In embracing both the normal and abnormal aspects of fertility, the author has dealt with a difficult subject in a most capable manner.

Firstly he gives a consideration of fertility and infertility, making quite clear that infertility is not a disease in itself—a fact not always appreciated by the farmer—but can be the result of a large group of diseases or errors of management.

Excellent chapters deal with reproduction in the female, in all its various phases, and the reproductive characteristics of normal male animals in considerable detail.

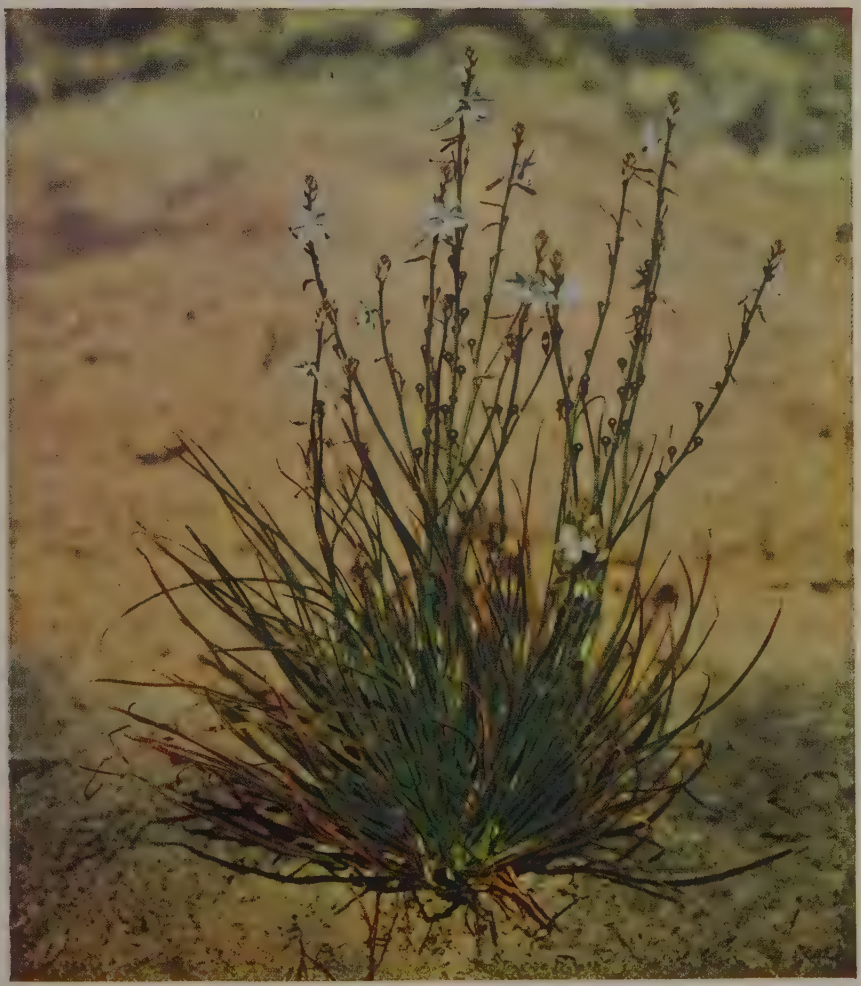
Complete descriptions of the genital organs of the various domestic animals, and the methods used in the examination of the organs, are also well set out.

The diagnosis of pregnancy is dealt with most comprehensively, and gives perhaps the most complete account of diagnosis in the domestic animals seen by the reviewer. The chapter dealing with this subject also includes differential diagnosis from pathological conditions, a very useful feature.

One chapter is devoted to artificial insemination, and this subject is particularly well handled.

Excellent chapters on the infectious and non-infectious diseases of the reproductive organs and nutrition in relation to infertility are included. In addition some particularly good plates of the organisms responsible for some of the genital diseases are reproduced.

The author is to be commended for the manner in which the book is set out, and it should be of considerable value to all veterinarians and veterinary and agricultural students. Whilst the book generally is too technical for the average farmer, the stud breeder and those more advanced farmers in the community should find much to interest them in it.—J.S.



ONION WEED

(*Asphodelus fistulosus* L.)

Onion Weed, native to the Mediterranean region, has become firmly established in many coastal localities and also occurs in a number of inland districts. Control by cultivation is not difficult, but it is troublesome in pastures and grows freely on roadsides.

WEEDS of Western Australia

By **G.R.W. MEADLY** M. Sc.
Officer in Charge, Weeds and Seeds Branch

ONION-WEED OR ASPHODEL

(Asphodelus fistulosus L.)

IN the form of its flowers and leaves Onion-weed shows a marked resemblance to the cultivated onion types, especially the shallot. They are members of the lily family although belonging to different genera—the true onions being species of Allium. Two notable differences are the absence of any conspicuous bulb formation in the case of Onion-weed, and the fact that it does not develop the characteristic smell of the garden plant.

It is interesting to note the diversity of forms and the difference in significance of various members of the lily family. To this group belongs a large number of herbaceous plants both useful and undesirable. Although those having economic value are restricted in number we have already mentioned the various types of onions which, along with asparagus are used as food plants. Certain others such as *Smilax* (Sarsaparilla), *Urginea* (Squills), *Aloe* (Aloes) and *Colchicum* have medicinal value.

Among the more robust types are New Zealand flax *(Phormium)* and Yucca both of which yield a commercial fibre. Probably the strangest members of the family and certainly those most unlike the general conception of a lily are the blackboys and grass trees which are such conspicuous components of the vegetation in many parts of this State.

Like many other aggressive introduced species, Onion-weed is native to the Mediterranean region but now occurs in all States of the Commonwealth. It is most plentiful in South Australia where it dominates areas to the almost complete exclusion of other plants. Roadsides and uncultivated land are most affected and the weed is conspicuous in some Adelaide suburbs as well as affecting agricultural land.

In Western Australia it has been recorded from a number of localities including Geraldton, Greenough, Fremantle, Rockingham, Esperance, Pithara, Koorda and Carnamah. For many years it was restricted to the coastal areas and it was assumed by some that maritime conditions and limestone soils were necessary for its growth. This assumption was dispelled when specimens were received from Pithara in 1938 and subsequently plants have been located in other inland districts. The heaviest infestation, however, still occurs in the Geraldton and Greenough area.

Anthericum divaricatum, a related plant resembling *Asphodelus fistulosus* is also known as Onion-weed and grows under similar conditions although to a lesser extent. It has a similar type of inflorescence but the leaves are flattened and it is generally more robust. Agriculturally it is comparable with *Asphodelus.*

DESCRIPTION

The name "Onion-weed" is obviously derived from the resemblance to the garden onion, while Asphodel is an abbreviation of the generic name. It is well to bear in mind also that Guildford grass *(Romulea rosea)* is sometimes referred to

ONION-WEED OR ASPHODEL.
(Asphodelus fistulosus L.)

A—Habit of plant; B—Single flower; C—Pistil, showing fruit developing; D—Fruit.

(From a pen-drawing by Mr. C. A. Gardner, Government Botanist.)

as Onion-Grass or even Onion-weed. In the Eastern States onion-grass is the accepted vernacular name of this plant.

Onion-weed is a hairless perennial herb 1 to 3ft. in height with numerous long, comparatively fine roots. The stem is hollow, simple or branching dichotomously towards the summit. The leaves are slender, semi-cylindrical, dark green, inserted spirally at the base. The flowers are white or flesh-coloured, in loose racemes and are subtended by whitish bracts. The six spreading perianth segments are each about ½in. long with a pinkish or brownish stripe along the main vein. There are six stamens with lance-shaped filaments, hairy at the base where they curve over the ovary. The stigma is three-lobed and the capsule globular, about ¼in. in diameter, transversely wrinkled and opening in locules. In each locule are one or two black, triangular seeds. These are covered with irregular elevations and depressions. The normal flowering period is July-November.

SIGNIFICANCE

Onion-weed is not known to be poisonous but, on the other hand, is seldom eaten by stock and cannot be regarded as having any forage value. Besides being a perennial it seeds freely and under favourable conditions will soon dominate uncultivated land. It is most conspicuous as a roadside weed but also intrudes into pastures, causing a considerable reduction in productivity. Fortunately our experience to date indicates that it is not a serious weed on land cultivated regularly, but ley farming introducing a rotation including several years of pasture could well favour the development of this weed. Its main disadvantage is that, after a period of years the density of growth provides severe competition for the desirable elements of a pasture. With few exceptions, in the affected areas these elements are of annual duration compared with the perennial habit of the Onion-weed.

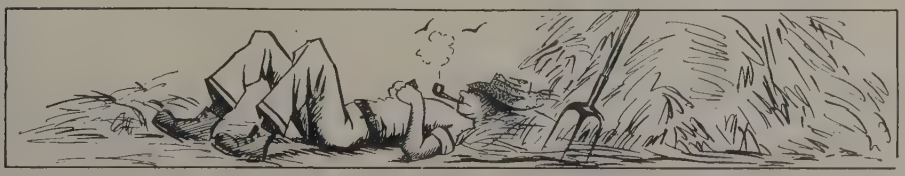
It has been declared a secondary noxious weed for the Road Districts of Dalwallinu, Yilgarn and Esperance and the Municipality of Bunbury.

CONTROL

When plants first appear they can be destroyed readily by pulling or grubbing and this should be done before seeds have been produced. The plant is not stoloniferous like a number of our more serious weeds and is relatively shallow rooted.

As already mentioned, cultivation is an effective control measure and Onion-weed is not troublesome on land that is worked regularly. Experiments undertaken at the Waite Research Institute by B. Roark and C. M. Donald showed that the weed can be reduced to small proportions by competition from vigorous perennial species, either grass or legume. Good results were obtained with perennial veldt grass, lucerne and *Phalaris tuberosa*, the last two being the most effective. Annual species such as Wimmera rye-grass did not prove very satisfactory but checked the weed to a greater extent at higher levels of nitrogen. An increased supply of nitrogen was even more important in the case of perennial rye-grass.

Perennial pasture species cannot be grown readily in the districts in this State where Onion-weed is most vigorous and therefore every effort should be made to prevent its encroachment into pastures. It is relatively resistant to the hormone-like herbicides, and chemicals such as sodium chlorate are too costly for other than small areas.



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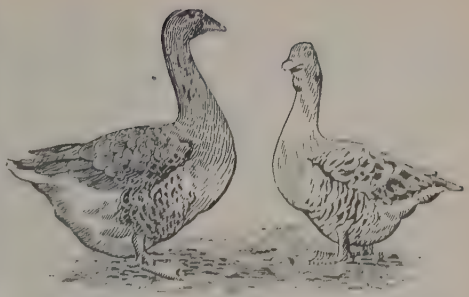
GEESE

Some Notes on Breeding, Feeding and Management

By S. FROOME



GEESE are essentially a sideline of farming activities, and where pasture is reasonably plentiful there is no doubt they can be made to pay if they are are managed correctly. The main object of keeping them is to produce meat for the table, egg production being considered only for breeding purposes. It is generally agreed that geese are the hardiest of all classes of poultry. Disease among adult stock seldom occurs, probably because the birds live under healthy, natural, open air conditions. Geese live for several years and in many cases it is economically sound to keep proven breeding stock for periods up to 10 or more years.

The number of geese in Western Australia in 1954, was approximately 750 which suggests that the breeding of this class of table bird has not been popular in this State. That the breeding of geese has been neglected appears to be rather remarkable. Geese do not require housing and furthermore, adult geese can live almost entirely on grass, are excellent foragers and when allowed free range are quite capable of looking after themselves. Year by year more land is being laid down to pasture in the South-Western portion of the State —particularly in the irrigated areas, and it is in these districts that a flock of geese should return a reasonable profit.

A small flock can be used to keep down the grass around farm buildings and provided they are kept from the vegetable and flower gardens, will keep the immediate surroundings of the farm free from long grass during the winter and spring.

BREEDS IN WESTERN AUSTRALIA

There are many breeds of geese in the different countries of the world, each country having its popular breed or breeds, but those in Western Australia are mainly Toulouse, Embden and a few Chinese. Environmental conditions partly determine the breed which should be selected for each farm; where pasture is good, Toulouse will do well, but the hardy Embden will thrive on rough, poor herbage. The following short notes on the breeds mentioned may be useful to the farmer who wishes to commence with geese:—

Embden.

The Embden is, perhaps, the most useful variety of goose. It gives good results in most situations as it is hardy, vigorous and prolific and, as a rule, fertility, hatchability, and rearability are exceptionally good.

The general characteristics of the adult are:—

Head—long and straight.

Bill—fairly short, stout at base.

Eyes—bold.

Neck—long, the throat uniform with the under mandible and neck.

Body—broad, thick, and well rounded; broad shoulders and stern; long straight back and deep paunch; large and strong wings; close tail; carried well out.

Legs—fairly short; large and strong shanks; straight toes connected by webs.

Carriage—upright.

Plumage—hard and tight.

Weight—gander 30 to 34 lb.; goose, 20 to 22 lb.

Colour—bill, orange; eyes, light blue; legs and feet, bright orange; plumage, pure glossy white.

This breed matures early, the breast is well fleshed, and the colour and texture of the flesh is very good. The goose usually lays 18 to 30 eggs in the first clutch and 10 to 12 in the second laying and is a good sitter and brooder.

The gander is often used to cross with other varieties and the quality of the flesh of the progeny is thereby improved. The goslings are easy to rear and mature quickly. They do not require housing after their backs are feathered. It is general for the goslings to be grey coloured on the back down and some will carry a few grey feathers on the rump.

Fig. 1.—Embden gander (front) and goose (rear) with their two young

Toulouse.

As the name denotes, this variety is of French origin and is popular with the fancier who interests himself in breeding exhibition birds. The Toulouse is unlike the Embden in type and colour. The throat shows plenty of gullet and the body is long, wide and deep. It is not as active as the Embden and the gander should not be mated to more than three geese, but is generally considered to be the best layer of the heavy breed geese. As a rule the Toulouse is not a good sitter, many strains show no signs of broodiness. The general characteristics of the breed are:—

Head—strong and massive.

Bill—strong, fairly short and well set in a uniform sweep from the point of the bill to the back of the skull.

Eyes—full and dark brown or hazel in colour.

Neck—long and thick, the throat well gulleted.

Body—long, broad and deep; prominent breast, deep and full; the keel straight from stern to paunch, increasing in width to the stern and forming a straight underline; broad shoulders.

Back—slightly curved from the neck to the tail; large and strong wings; somewhat short tail carried high and well spread; paunch and stern heavy and wide, with a full rising sweep to the tail.

Legs—short; shanks, stout and strong boned; straight toes connected by webs.

Carriage—somewhat horizontal, not as upright in front as the Embden, and thick-set.

Plumage—full; somewhat soft.

Weight—Gander 28 to 30 lb.; goose 20 to 22 lb.

Colour—Bill, legs and feet orange; plumage—neck dark grey; breast and keel, rather light grey shading to thighs; back wings and thighs, dark steel grey, each feather laced with an almost white edging, the flights without white; stern, paunch and tail, white; the tail with a broad band of grey across the centre.

Chinese.

The original Chinese variety is found in China, Siberia and India and its general appearance suggests a swan, especially in the neck, head, and knobbed bill. It is smaller in size than either the Toulouse

or Embden, is hardy and a more prolific egg layer than the two breeds mentioned previously. It is a lover of water but appears to be quite contented and its eggs will show good fertility without any swimming water. The Chinese goose often lay up to 60 eggs a year and mated to an active Embden gander will give many fast growing goslings which will show the deep and wide body of the Embden. The goose is a good sitter and mother, and will hatch out and rear her goslings most successfully. There are two varieties—the white has an orange bill and orange-yellow shanks. The brown variety has many shades of brown with whitish under parts and with a darker brown stripe running down the back of the neck. The bill is black or dark slate and the shanks are orange. No standard of perfection has been laid down for this breed.

AVERAGE WEIGHTS OF BREEDS

The weights previously given for the Toulouse and Embden breeds are those required by the English Poultry Club's Standard of Perfection, but the following table approximates more closely the weights obtained in general use:—

Breed	Adult Gander	Adult Goose	Young Gander	Young Goose
	lb.	lb.	lb.	lb.
Toulouse	26	20	20	16
Embden	20	18	18	16
Chinese	12	10	10	8

As geese are raised primarily for meat the breed or cross breed should be selected for its rapid growth and efficient meat production. Under Western Australian conditions it is probable that the Embden or Embden-Chinese cross would give the best results.

SELECTING AND MATING THE BREEDING GEESE

It is not easy to distinguish the sex of geese as both sexes resemble each other closely. The following points may be helpful:—The gander has a high shrill voice, but the goose has a harsh, hoarse cry; at the same age, the gander is usually larger than the goose, has a slightly longer neck and larger head.

The sex of each bird over seven months of age may be determined by examining the sexual organs. An assistant should hold the bird flat on its back. In the females, the sphincter muscle which closes the anus appears folded if stretched. In the male, slight pressure around the anus usually results in the sexual organ being protruded.

Best results are obtained when females of two years of age or more are used in the breeding pen. If younger birds are used, the goslings hatched from these birds should not be kept for breeding purposes but should be marketed. Yearling ganders may be used provided they are well matured specimens of at least eight months of age. The best age for breeding is from the third to the fifth year. Females give good results for 10 years but it is not advisable to keep ganders for more than six years. The breeding stock should be selected from the progeny of breeders that are three years old or older, and as the laying season is usually short and rarely exceeds six months they should be the progeny of females which have proved good layers. The breeders should be healthy, vigorous birds, up to weight, the body long, wide and deep, not coarse in the head and with bright alert eyes. They should be handled for faults, such as, abnormal feet, roach back, and crooked keel bone.

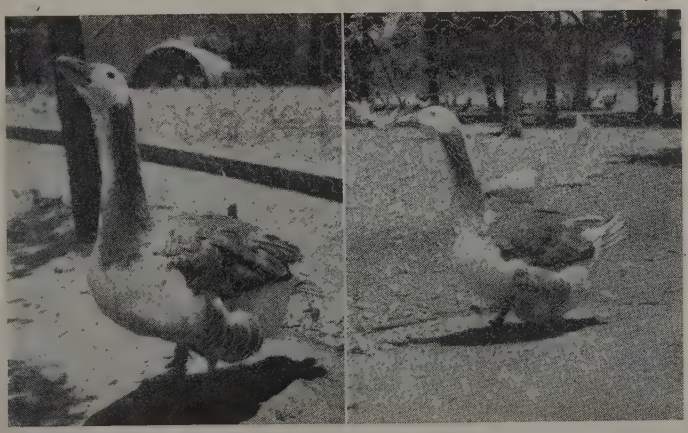


Fig. 2.—Good specimens of the Toulouse breed. The gander is shown in the left-hand photograph and the goose on the right. Note large body size

Early selection and mating is advisable as it takes geese some time to settle down, therefore, pens should be made up in the autumn. Each pen should be kept separate during the breeding season to prevent the ganders from fighting. It is customary to run two to three females with one gander, but one gander of the Chinese breed may be successfully mated with five females.

It is possible to flock-mate with geese but it requires patience and close observation. A perfectly mated flock pen can consist of either two ganders and eight females, or three ganders and 12 females. Most satisfactory flock matings are secured by bringing the sexes together while both are still in the gosling stage. It is advisable to put together more birds than will be required to allow for the culling of unsatisfactory individuals. Close observation should be made as the birds near the adult stage; it is usual to find a certain amount of fighting among the ganders. If they are fairly evenly matched no serious harm will result but if one gander obtains an undisputed mastery over the rest he should be removed and mated to two or three geese in a separate pen. Ganders which submit to bullying must be removed for they will never be given an opportunity to mate with the geese.

Females harassed by their own sex and ignored by the ganders will be noticed moping and moving about alone, and should be culled. Watch the geese at the feeding trough, the bully and the bird which habitually hangs back will be noticeable and both should be culled.

For flock mating of geese to be successful, absolute harmony with the flock is required.

Fig. 3.—Three specimens of the Chinese breed. Note the knobbed bill. The gander is in the rear and the goose in the front, with a 12-week-old young bird between them

HOUSING AND MANAGING THE BREEDERS

When flock mating is not practised it is necessary to confine each breeding flock in a separate pen. The yards should be as large as possible and a fence about 3ft. high will keep the birds confined. Prior to mating, the yards should be planted with a green crop to give breeders as much pasture as possible. The yards should contain a number of shade trees as geese must be protected from the hot sun.

Housing does not present much of a problem. A small shed with a wire netting front, which can be closed up at night as a protection against foxes is sufficient. A cement floor above ground level must be provided to ensure dry sleeping quarters and must be covered with plenty of clean straw, shavings, or sawdust. Both goslings and geese are apt to foul their sleeping quarters, therefore, the litter requires changing frequently. Nest boxes should be provided but many geese prefer to make their own nests on the litter.

Eggs should be collected daily as it tends to stimulate further laying. It is not economically sound to allow a goose to incubate her own eggs. She should be used to produce as many eggs as possible during

the relatively short laying season. Should a goose become broody she should be placed in a coop with a slatted floor and given plenty to eat and drink. The coop must be placed in the yard so that the goose is within sight and hearing of the other members of the breeding pen, otherwise she may not be received by them when she is liberated.

INCUBATING GOOSE EGGS

The eggs which are gathered every day should be stored in a cool place until required. A cellar with a cement floor which can be moistened with water makes an excellent storage room. The eggs should be placed on their sides on trays and turned each day. The fresher the eggs when put down for incubation the better will be the hatch. The best results are obtained when the eggs are not more than a week old.

The incubation period with the smaller breeds of geese is about 30 days and with the larger breeds about 32 to 34 days. The eggs may be hatched under hens, muscovy ducks, or with a limited degree of success in small incubators. Whichever method is used it must be noted that the eggs require more moisture than hen eggs during the incubation period.

Most goose raisers prefer to use hens and set four to six eggs under each hen depending upon her size and the size of the eggs. A saucer shaped hollow in the ground covered with a box makes a good nest. When the broody hen leaves the nest for food every evening the eggs should be turned by hand as they are too heavy for the broody hen. Every day after the 15th day the eggs should be sprinkled with luke-warm water when they are turned. Test the eggs on the ninth day and remove all infertile ones and those containing dead embryos.

In the early part of the season it is often impossible to secure broodies and artificial incubation is necessary. The small ordinary hot air incubater will hatch out strong, sound goslings provided the eggs are not over four or five days old. The temperature depends on the type of incubator. In the still air machines a temperature of 102° F. at the top of the eggs as they rest on the tray should be maintained for the first ten days, and after this period the temperature can be allowed to reach 103° F. Turn the eggs twice daily up to the "chipping" stage and the time taken in turning will cool the eggs sufficiently. Test eggs on the ninth day and remove all that are infertile or have dead embryos. Provide moisture in the trays throughout the period of incubation and sprinkle the eggs with lukewarm water every day after the 15 day.

BROODING AND REARING GOSLINGS

If a broody hen has been used she can be given, and will mother, six to eight goslings. The hen should be confined to a coop with a removable board floor for about ten days. The coop should have a slatted front and a small run should be attached to the front of the coop. If pos-

Fig. 4.—A group of Toulouse geese and ganders. Note the characteristic attitude of the gander in the right foreground as it prepares to protect its young. There are two ganders in this group. Individual mating of one gander to three geese is preferable, but flock mating can be quite successful (see text)

sible, the coop and run should be placed on short grass or other succulent pasture and should be moved to a fresh patch of grass each day. Until the goslings are three weeks old they should be kept out of water and not allowed to wander in long wet grass.

If incubated by artificial methods it is necessary to provide brooding equipment. The ordinary type of brooder will suffice, maintaining the same brooder conditions as used for ducklings. The goslings should have access to a grass run and if the weather is fine can run out when they are four days old. Early hatched goslings should be protected against cold winds and will require heat for two to three weeks. Goslings hatched in the summer can do without artificial heat.

Goslings older than four weeks will benefit by running on a well grassed range, but if confined to a small area it must be kept clean and the sleeping quarters must have plenty of dry litter.

Goslings are similar to ducklings in their shade requirements. If goslings are exposed to the hot sun in the summer time before they are feathered, many deaths will occur.

Fig. 5.—A sitting Toulouse goose under natural conditions

FEEDING

Feeding Goslings.

Goslings do not require feed until they are 36 hours old when they can be given a wet mash consisting of a chick starter mash and chaffed green feed mixed with skim milk or water. As young grass and other succulent green feed comprises the major portion of the feed for goslings it is difficult to obtain data concerning their protein requirements. Day-old goslings of the Embden and Toulouse breeds weigh approximately 3 to 3.5 oz. and at four weeks of age they will average 3.5 lb. This rapid gain in weight in so short a period must be catered for and it would appear that the dry ingredients of the mash should contain approximately 18 per cent. of protein. The 16 per cent. protein mashes for chicks one to six weeks of age given in Table 10 in Bulletin No. 995 "Nutritional Requirements of the Domestic Fowl," by R. H. Morris, Department of Agriculture, should give good growth providing the protein is increased by two per cent. The addition of 4 lb. of a 50 per cent. protein meatmeal to any of the mashes would increase the protein content to approximately 18 per cent. Number 3 mash in Table 10 would be:—Bran 36 lb. wheatmeal 22 lb., pollard 10 lb., gristed oats 10 lb., meatmeal 12 lb., dried buttermilk 4 lb., and bonemeal 1 lb. and would have a protein content of 17.78 per cent. Sufficient mash (a quantity which the goslings will consume in 15 minutes) should be fed five times a day.

In addition, they should be running out on good grass or on green crops especially planted for the purpose. If suitable pasture is not available, extra feeding of finely chopped lucerne, grass, lettuce or cabbage is advisable.

When green feed is short a Vitamin A containing oil should be included in the mash at the recommended level.

For information on the use of Vitamin A refer to the leaflet mentioned previously.

Plenty of fresh clean drinking water should be supplied in containers deep enough for the goslings to immerse their heads, but arranged in such a manner that they cannot get into the containers.

Feeding the Growing Stock.

After the goslings are four weeks of age and if they have plenty of grass they will not require any other feed until the green feed becomes short in the summer months. Low-lying, swampy land is ideal for the growing stock in the summer if permanent pasture can be maintained, or if green crops can be planted. Geese are good grazers and on irrigated areas should find sufficient feed for most of the year. When pasture is not available growing geese should receive plenty of roughage and one feed of mash or grain daily. The roughage should form the major portion of the feed and may be cut green feed, clover or lucerne hay, fruit and vegetables, such as rape, cabbage, lucerne, green maize, elephant grass, turnips, beetroot, apples, tomatoes, and cooked potatoes. If mash is given it should be a growing mash as fed to chickens. If grain is preferred to mash the grain must be a good quality, plump oat or a mixture of equal parts of oats, wheat and barley.

It has been estimated that, when it is necessary to feed mash or grain to growing stock, goslings from the age of six to 26 weeks will consume approximately 6 oz. of dry material per day. This amount should be considered the minimum requirement in addition to the roughage.

Reports of experiments carried out in England show that little advantage was gained by feeding concentrates to goslings throughout the growing period, provided they have free access to grazing. It was concluded that a satisfactory carcass could be produced without the use of concentrates from the age of five weeks until a month before marketing, that is, from five weeks to 26 weeks.

Feeding the Breeders.

During most of the year the breeders will secure their feed from pasture or from pasture plus supplementary feeding, but two months before the breeding season commences they will require feeding for egg production. A mash containing 15-15½ per cent. protein, as fed to laying hens, will give satisfactory results. Any of the mashes given in Table 13 of the Departmental leaflet No. 995 would be suitable and should be fed twice a day to the breeders in addition to the food they will find in grazing. Allow 6 oz. of dry material per bird per day. Mix the mash with an equal volume of chaffed green feed and moisten the whole mixture with water until it is in a crumbly condition.

Fattening Geese.

Under normal conditions young geese nearing market stage, that is, six to seven months of age, will be in good condition. If they have been on good pasture, or on pastures and supplementary feed they are

Fig. 6.—Two Toulouse geese sitting on eggs. This is a wasteful practice as the laying season for geese is somewhat short and the birds should be used to produce as many eggs as possible during the period

Fig. 7.—Hens may be used successfully in the hatching of goslings. Usually five goose eggs are allowed to each hen

inclined to become fat. The final fattening should commence three weeks before the birds are marketed. Experiments carried out in Hungary show that the gain in weight declines after the third week and by the end of the fourth week the birds commence to lose weight.

Partly darkened fattening pens in which the geese have little room for exercise are recommended.

Three feeds of mash per day and one of green feed or chopped up vegetables should be provided. Thirty minutes after each feeding the remainder of the food should be removed. The ingredients in the mash should be mainly gristed grains and a mash containing 12½ per cent. of protein and similar to the mash used to fatten cockerels—in Bulletin No. 995—is recommended.

A suitable mash would be as follows—Gristed wheat 60 lb., gristed oats 20 lb., bran 10 lb., pollard 10 lb., and meatmeal 4 lb., moistened with water to a crumbly condition. Plenty of clean drinking water should be provided. Force feeding or noodling of geese is practised in some countries where a superior fattened goose or enormous enlargement of the liver is required. Noodles are made from gristed grains and are shaped like a large pellet about 2½ to 3 inches long. The noodles are placed one at a time in the goose's mouth and forced down the throat by pressure on the outside of the goose's neck. At the commencement of the fattening period 3 to 5 noodles are fed three times a day increasing up to 7 noodles fed five times daily. In Hungary, forced feeding experiments were carried out for a period of 28 days. In that period each bird consumed an average of 1.26 lb. of feed per day and gained 6.17 lb. in weight during the period.

MARKETING GEESE

Early-hatched goslings can be fed to grow quickly and marketed when they are ten weeks old. The term usually applied to that class of table bird is "green geese." Most farm-raised goslings of the Embden and Toulouse breeds given proper care and feeding should weigh about 9 lb. at 10 weeks of age.

The majority of geese are marketed when they are about 7½ months of age, that is, they are allowed to graze until they are 26 weeks old and then fattened for about three weeks. The rate of growth is very rapid for the first eights weeks, but after that the gain in weight is slower, but a finished goose of the two breeds mentioned should weigh about 16 to 18 lb. when ready to market. During the fattening period and when crating for market, geese should be handled as carefully as possible to prevent the skin from being torn, or the flesh bruised, as these defects will reduce their value.

DISEASES OF GEESE

Losses from mortality among geese are usually not so great relatively as among fowls and turkeys, probably because geese are raised in smaller units and forage widely so much of the time. The best way to prevent losses from all diseases affecting geese is to keep the breeding quarters clean

Fig. 8.—A one-week-old Toulouse gosling

and dry and move the brooding coop on to clean ground daily. Provide clean water and keep the feeding and watering utensils clean.

The diseases which may atack geese are:—

Coccidiosis.

Geese can be affected with renal coccidiosis caused by *Eimeria truncata.* This parasite attacks geese of from three weeks to three months of age. This disease is very acute, lasting only two or three days and is almost always fatal. Usually the mortality in a flock is very high. The clinical signs are extreme weakness and emaciation. So far as is known, the parasite is specific to geese. Cases have occurred in Europe and in the United States of America.

Botulism.

This disease has been reported in Australia, United States, Mexico, Holland and Canda. It is a type of food-poisoning which results from ingestion of spoiled foods in which the bacterium *Clostridium botulinum,* has been growing and producing toxins.

This organism and its toxins have been isolated from the livers of affected birds, mud, decaying vegetation and carcasses, various fly larvae, dead fish, dead grasshoppers, and grain lying in water. The incidence of the disease is closely correlated with with shallow stagnant water and mud flats.

Symptoms may appear within a few hours to a day or two after the spoiled food is eaten. The most common symptom is paralysis of the leg and wing. If the

Fig. 9.—Three five-week-old Toulouse goslings. They are usually marketed when seven and a half months old

neck muscles are affected the head hangs limp. The eyes are dull and partly closed, the feathers are ruffled and the bird refuses to eat. Fatally affected birds appear lifeless for several hours before death, but in mild cases the leg weakness may disappear and the birds recover in two or three days. Looseness of the feathers is often seen in botulism.

Prevention of botulism depends on feeding a wholesome ration, and preventing the birds having access to decomposed meat and vegetables. Laxatives such as castor oil or epsom salts are of value in the treatment of mildly affected cases. Birds should be dosed individually with half an ounce of castor oil, and if necessary the treatment repeated until the digestive tract is empty.

Paratyphoid of Geese.

Outbreaks of this disease have occurred in Europe and America; extensive losses amongst young geese were reported in East Prussia in 1922. The birds show weakness, loss of appetite, increased desire for water, sleepiness and conjunctivitis. In outbreaks of the acute type, the mortality may reach 95 per cent. by the second to the fourth day following the onset. The disease is caused by a Paratyphoid B type organism. Eggs may be infected internally as a result of localisation of the bacilli in the ovary. At the present time there is no satisfactory means by which infected breeding birds can be detected and removed from the infected flock.

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ACKNOWLEDGMENTS

Grateful acknowledgment is made to Mr. C. Balmer (Government Photographer) who is responsible for all the photographs which appear in this article, and to Messrs. H. Stoddart, Palmyra; C. Shepperd, Maddington, and H. P. Chalmer, Melville, whose birds are shown in these photographs.

(Reprinted from "Journal of Department of Agriculture of Western Australia," Vol. XXVII. (Second Series), No. 3, September, 1950.)

Book Review.

"FARM ANIMALS IN HEALTH AND DISEASE"—(W. R. Wooldridge)

FOR the student, and for the farmer who is interested in widening the scope of his knowledge of the various diseases of farm animals, this book should prove interesting and useful for reference purposes.

Unfortunately, from the Australian viewpoint, much of the book deals with diseases not present in this country, and with disease control measures and other matters not relevant to Australian conditions.

Veterinary services are readily obtainable and widely availed of in Great Britain, and this may be the reason treatments of individual diseases are not discussed in more detail. More specific information in regard to treatment of disease is essential in a State such as Western Australia where skilled veterinary attention is not always available, and the farmer has no option but to treat sick animals as best he can.

Sections dealing with good health, ill health, the mechanism of digestion in the various animals, and the cost of ill health to the country, are both interesting and instructional, and serve to emphasise the present trend of veterinary science in regard to prevention of disease rather than treatment of individual animals.

The section dealing with diseases in rabbits, is, of course, superfluous in this country.—J.S.

INSECT Pests AND THEIR CONTROL

By B. A. B. EDWARDS and D. G. SHEDLEY

WHITE WAX SCALE

(Ceroplastes destructor Newstead)

THE EVALUATION OF CONTROL METHODS, THE USE OF ORGANIC INSECTICIDES AND SCALE DISTRIBUTION ON CITRUS TREES IN WESTERN AUSTRALIA

VARIOUS treatments of white oil and white oil-soda sprays have been tested in Western Australia against the white wax scale (Ceroplastes destructor Newstead) which mainly attacks citrus trees. Reference has been previously made to this experiment (Jenkins, Shedley and Edwards, 1953).

Outstanding results were obtained using a white oil (1 in 40)-soda (4 ozs. per gallon) spray applied at the late peak stage.

Equally good results were also obtained with two 1 in 40 white oil sprays applied two weeks and four weeks after the main emergence of larvae.

At the early peak stage a single white oil-soda spray gave good control. Using half the concentration of soda a similar application following a white oil spray a fortnight after the main emergence of larvae gave comparable results.

Indications from a trial are that no effective control can be obtained using chlordane, aldrin or dieldrin as 0.5 per cent. sprays a fortnight after the main emergence of larvae.

On the experimental site the scale population was less dense on the west side and lower portions of the trees.

INTRODUCTION

A native of South Africa, the white wax scale was first recorded in Western Australia in the field in 1911 (Newman, 1911) infesting citrus trees near Kalamunda but had been observed prior to this in a Perth nursery. The scale was referred to as *C. ceriferus* Anderson until it was identified in 1933 as *C. destructor* (O'Connor, 1933). Its spread since 1911 has been slow, but the infestation now occurs in most of the Hills district from Chittering in the north to Armadale in the south and also the associated coastal districts.

Measures for the control of the scale up to the present have been confined to the application of sprays at different times in its development, but there has been no attempt to compare and contrast these methods. The possible effect of the newer organic insecticides on the larvae of the scale has also aroused considerable interest.

EXPERIMENT, 1951-1952

The main experiment was designed to compare the control of white wax scale by white oil alone and by a combination of white oil and soda ash applied at different times in the life history of the insect.

Fig. 1.—Trees on the experimental site. Left, untreated tree, showing dark foliage, due to sooty mould. Right, sprayed tree with healthy foliage

Treatments.—After a survey of available literature, it was decided to apply the following treatments:—

(1) One white oil spray applied 14 days after the main emergence of crawlers. (Applied January 9, 1952.)

(2) Two white oil sprays. The first application as in (1)—the second a fortnight later.

(3) One white oil spray as in (1) followed by a white oil-soda ash (2 ozs. per gallon) spray soon after at the early peak stage. (Applied February 27, 1952.)

(4) A white oil-soda ash spray applied at half the quantity normally used at the early peak stage. (Applied February 27, 1952.)

(5) A white oil-soda ash spray applied thoroughly at the same time as (4).

(6) A white oil-soda ash spray applied at the late peak stage. (Applied April 23, 1952.)

(7) Control—no treatment.

White oil was used at a strength of 1 gallon to 40 gallons of water in all cases. Soda ash, except where stated, at the rate of 4 oz. per gallon.

Site.—The site selected was on the property of Mr. R. C. Owen, Pickering Brook, where a suitable number of uniform Valencia orange trees were located with a reasonably constant scale infestation.

Design.—A randomised block design was used with five replications of seven treatments. Each plot consisted of three adjacent trees in an approximate north-south line.

Application.—The sprays were applied with a power spray operating at a pressure of approximately 300 lb. per square inch and delivering nearly two gallons per minute. From 3½ to 4 gallons were applied to each tree except in Treatment (4) where half the normal amount of spray (approximately 2 gallons) was used.

Sampling.—As most of the scales settled on or near the extremities of the twigs, it was decided to sample by counting the number of scales on the terminal six inches of a twig. Since it was thought that the number of scales counted might vary with the position of the twig, 12 positions on each tree were selected, viz., north, south, east and west with lower, middle and upper places on each side of the trees. The twigs were picked at random and by this procedure 36 samples per plot were obtained.

Sampling was completed on October 15, 1952, with four persons sampling and one recording. The positions of sampling for each person (e.g. north) remained constant over the entire sampling.

Results—(See Table 1).

The tabulated figures in Table 1 are the total number of scales occurring on the twigs in the 12 positions selected on each tree.

Due to the skew distribution of the population an analysis of variance using the log (1+x) transformation was made.

Examination of the results from Table 1 allows the following conclusions:—

(i) All treatments show significant control of white wax scale at the 0.1 per cent. level.

(ii) The white oil-soda spray applied at a late peak stage (April 23) was outstanding and significantly better (0.1 per cent. level) than white oil-soda sprayed thoroughly or lightly at the early peak stage February 27).

(iii) Two applications of white oil (January 9 and January 24) were as good as a white oil-soda spray applied on April 23.

(iv) The thorough application of a white oil-soda spray on February 27 was significantly better (1 per cent. level) than the white oil-soda spray applied at half the rate of application on the same date.

Scale Distribution on the Trees.—See Table 2.

TABLE 1.

Scales per Tree Treatments.

Blocks.	1. White oil one application.				2. White oil two applications.				3. White oil and White oil-soda later.				4. White oil-soda, ½ quantity spray.				5. White oil-soda well sprayed.				6. White oil-soda one application late.				7. Control.		
	Trees.				Trees.				Trees.				Trees.				Trees.				Trees.				Trees.		
	X.	Y.	Z.	Total	X.	Y.	Z.	Total	X.	Y.	Z.	Total	X.	Y.	Z.	Total	X.	Y.	Z.	Total	X.	Y.	Z.	Total	X.	Y.	Z.	Total
A	147	49	76	272	2	10	4	16	11	10	9	30	46	78	95	219	33	12	16	61	9	0	6	15	287	193	348	828
B	118	15	48	181	5	1	7	13	8	4	6	18	75	89	30	194	4	38	35	77	3	10	0	13	259	230	208	697
C	13	47	13	73	12	10	8	30	20	35	8	63	30	112	56	198	35	17	7	59	4	1	5	10	408	252	156	816
D	44	70	27	141	7	4	4	15	2	1	12	15	86	14	32	132	14	39	98	151	1	15	1	17	396	238	158	792
E	34	49	23	106	1	0	7	8	17	12	10	39	77	32	14	123	0	11	0	11	0	0	0	0	237	330	205	778
Totals	356	230	187	773	27	25	30	82	58	62	45	165	314	325	227	866	86	117	156	359	17	26	12	55	1,587	1,249	1,075	3,911
Arithmetic Mean			51				5				11				58				24				4				251
Geometric Mean			41				4				9				48				13				2				237
Mean log (1+x)			1·6183				0·7200				0·9836				1·6933				1·1527				0·4714				2·3778

Least difference for significance at 5% level—0·3122
1% level—0·4203
0·1% level—0·5629

TABLE 2.

Control Plots. Numbers of Scions.

Block.		Tree X.					Tree Y.					Tree Z.					Block totals.
		N.	S.	E.	W.	Total.	N.	S.	E.	W.	Total.	N.	S.	E.	W.	Total.	
A	Lower	19	10	10	13	52	10	0	1	9	20	5	21	67	10	104	176
	Middle	16	55	43	7	121	15	13	10	35	73	32	43	17	8	100	294
	Upper	39	35	14	26	114	14	35	12	39	100	25	73	35	11	144	358
B	Lower	25	2	19	7	53	3	0	16	16	35	3	23	24	0	50	138
	Middle	12	30	32	16	90	16	14	40	6	76	21	16	6	13	56	222
	Upper	9	41	35	31	116	15	52	31	21	119	17	39	22	24	102	337
C	Lower	27	40	38	3	108	5	6	19	10	40	44	5	0	0	49	197
	Middle	15	60	21	7	103	18	5	50	14	87	4	0	12	12	28	218
	Upper	32	81	47	37	197	32	35	33	25	125	27	11	37	4	79	401
D	Lower	47	30	40	1	118	27	28	28	10	93	4	2	21	1	28	239
	Middle	12	44	74	24	154	10	16	18	12	56	14	52	7	2	75	285
	Upper	25	19	43	37	124	23	19	21	26	89	24	4	6	21	55	268
E	Lower	2	0	2	2	6	17	35	28	4	84	27	7	31	7	72	162
	Middle	21	43	11	6	81	36	44	39	7	126	17	7	12	7	43	250
	Upper	39	48	49	14	150	30	34	48	14	126	31	10	25	24	90	366
Totals		340	538	478	281	...	271	336	394	248	...	295	314	322	144	...	...

Log mean $(1+x)$.

For Height.		For Direction.	
Lower	0·9760	N.	1·2416
Middle	1·2255	S.	1·2278
Upper	1·4140	E.	1·3219
		W.	1·0291

Least Differences for Significance.

For Height.		For Direction.
At 5% level	0·1426	0·1647
At 1% level	0·1887	0·2179
At 0·1% level	0·2427	0·2802

Fig. 2.—Twigs showing effect of treatment. Left, white oil soda ash spray. Centre, white oil soda ash, lightly sprayed. Right, control, no treatment

As a survey of the population of scales indicated differences between the positions of sampling, an analysis of variance (Table 2) was made using log (1+x) transformation as in the main analysis. Figures obtained for the control plots were used for this purpose.

Examination of this analysis allows the following conclusions:—

(i) For Height Positions.

(a) The lower portions of the trees had significantly less scales (0.1 per cent. level) than both the middle and and upper portions of the trees.

(b) The population of the scales in the middle part was significantly less (5 per cent. level) than the upper part of the trees.

(ii) For Direction.

(a) The population of scales on the trees was significantly less (0.1 per cent. level) on the western side than on the eastern side of the trees and also significantly less (5 per cent. level) than the northern and southern sides of the tree.

(b) The northern, southern and eastern sides of the trees do not show significant differences in population from each other.

Spray Damage.—Particular care was taken to see that treatments were not applied during the experiment when the temperature was above 90°F. Only very slight burning of the foliage was observed in any of the treatments.

TRIAL, 1951-1952

A small trial was undertaken to test the effectiveness of the new organic insecticides chlordane, aldrin and dieldrin.

Two navel oranges trees were used for each treatment. Three gallons of spray were applied to each tree with a knapsack spray, a 0.5 per cent. solution of each insecticide being used in each case. The treatments were applied a fortnight after the first emergence of the larvae, i.e. on January 9, 1952.

An inspection of the trees some time after treatment suggested that there was no appreciable diminution in the number of scales present as compared with those present on untreated trees.

Counts were made in the same manner as for the main experiment and are listed in Table 3.

TABLE 3.

Number of Scales.

White Wax Scale Trial.

Treatment	Tree X	Tree Y	Total.
Chlordane	69	99	168
Aldrin	94	180	274
Dieldrin	84	173	257
Control	206	190	396

From these results the indications are that the insecticides at the time and strengths used did not give a control which could be compared with the recommended treatments.

DISCUSSION

From the results of the work carried out over the present experiment, it can be seen that both a white oil-soda spray at the late peak stage and also the application of two white oil sprays two and four weeks after the main emergence of the larvae, are the best methods for control of white wax scale in Western Australia.

Alternative treatments, which should give satisfactory control, are a white oil-soda spray applied at the early peak stage, and a white oil spray a fortnight after the main emergence of larvae followed by a white oil-soda spray at the early peak stage using half the normal amount of soda.

The timing and thoroughness of the spray applications were most important factors in obtaining good results with the materials used. In an effort to show the effect of inefficient spraying, one treatment was applied at half the rate used in all other treatments, and from the results was significantly inferior to the thorough application of the same date. In all the other treatments with a power spraying unit operating at a pressure of approximately 300 lb. per square inch, 3½ to 4 gallons were used for a medium sized tree.

Fg. 3.—Comparisons of treated and untreated foliage. Left, treatment No. 2 (two white oil sprays). Right, control (no spray)

An early observation that the intensity of the population of scales varied according to the position on the trees was borne out by an analysis. Generally the west sides of the trees were found to be less heavily infested and the population tended to be denser on the upper portions of the trees.

When applied as 0.5 per cent concentration sprays a fortnight after the main emergence of larvae, chlordane, aldrin and dieldrin gave results which indicate that they do not give satisfactory control of white wax scale at the strength and time used.

ACKNOWLEDGMENTS

The authors wish to thank Mr. C. F. H. Jenkins (Government Entomologist) who suggested the project and for his interest while it was being carried out.

We wish to thank Mr. R. C. Owen, M.L.A., Pickering Brook, on whose property the work was carried out and whose assistance was greatly appreciated.

We are also indebted to Mr. N. Stenhouse, Research Officer, Section of Mathematical Statistics, C.S.I.R.O., Western Australia, who carried out the main part of the statistical analysis.

For their help in spraying and sampling of the experiment we are grateful to other members of the Entomology Branch of the Department of Agriculture.

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Book Review.

TIMBER IN DOMESTIC BUILDING

So much timber goes into house building that it behoves those using it to have sufficient knowledge of its properties and preparation to use it well and, since world supplies are on the decline, to use it economically. This is particularly important in Australia which is fortunate in the number and variety of its timber species.

Ample information on timber is available in the excellent publications produced by the C.S.I.R.O. Division of Forest Products, and by several State Forestry Departments. However, most of these pamphlets deal with particular aspects of the subject. For this reason the latest number in the Notes on the Science of Building series No. SB 34, "Timber in Domestic Building" is of special interest.

In SB 34 the Commonwealth Experimental Building Station has set out to help the small home builder to select and use wisely the timbers available to him. The Note discusses the general properties of timbers required for various purposes, and reviews briefly the important subjects of strength, grading and seasoning. It then examines the selection of timber for framing, cladding, flooring and joinery. A section on decay and insect attack completes the Note.

Notes on the Science of Building No. SB 34: "Timber in Domestic Building," published by the Commonwealth Experimental Building Station, price 9d. (postage included), may be obtained from the Station, Box 30, CHATSWOOD, N.S.W., or from the Building Research Liaison Service, Box 2807AA, MELBOURNE.

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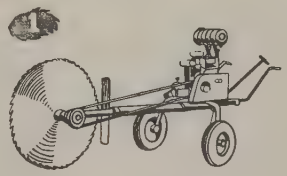

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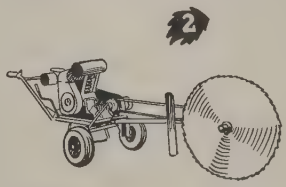

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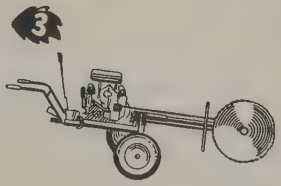

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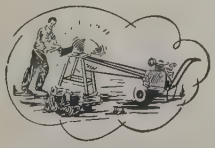

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Hormone Sprays and their Effects on the Setting, Yield and Vigour of Currant Grape Vines

By L. T. JONES, Senior Plant Research Officer

IN 1942, the Department of Agriculture was asked to investigate a serious decline in yield and vigour of grape vines on certain areas in the Swan Valley. The varieties mainly affected were muscats and currants. The problem was most severe on the soil types of a sand or light sandy loam nature and in poorly drained areas. On areas of heavier textured soils with a friable clay subsoil the vines were generally regarded as economically satisfactory.

Immediate replanting of problem areas in practically all cases resulted in poor replant vines. In some cases, with replant currants, growth was judged satisfactory until they were cinctured and commenced cropping.

New plantings on virgin areas (including old pasture paddocks) resulted, initially at least, in good growth on all classes of soil. Originally, soil deficiencies were suspected, and this approach was in accord with the opinions of all growers consulted. As a consequence a series of fertiliser trials were commenced in 1942. By 1950 a great bulk of information consisting of yields, chemicals analyses and years of observations of the problem under a variety of conditions indicated that the vine deterioration and replant problem would not be adequately solved by fertiliser treatment. Up till this stage the deteriorated root system common to all problem vines had been accepted as the effect of a fertiliser deficiency. A previous local success with copper on currants with apparently identical growth symptoms had kept alive the hope that, given time, the root growth would improve under fertiliser treatment.

Having exhausted this line of attack the way was now clear for considering the theory that a deteriorated root system could in itself be the cause of the problem. This new outlook resulted in an immediate examination of all possible factors that would depress root growth. The list considered was as follows:—

(1) Cincturing of currant vines.
(2) Nematode damage.
(3) Waterlogging.
(4) Moisture stress.
(5) Plough soles.
(6) Organic matter and soil deterioration.
(7) Soil toxicities.
(8) Overcropping.
(9) Root injury from cultivation implements.

In 1951 a project was commenced, in co-operation with the Plant Pathology Branch, on an investigation of the part played by nematode damage in the vine deterioration and replant problem. The presence of nematodes was recorded but as their numbers were as high on healthy vines as on weak vines it was concluded that nematode damage was not likely to be a major factor in the decline of the grape vines. Soil fumigation of a replant area gave a small initial response which was most apparent under moisture stress. In the first season better root growth resulted in the fumigated area and leaf analyses showed a higher content of potassium and manganese as well as producing practically twice the amount of foliage. In this experimental area now, irrespective of fumigation treatment,

muscats have made poor growth, and uncinctured and uncropped four-year-old currants have made fair but not vigorous growth.

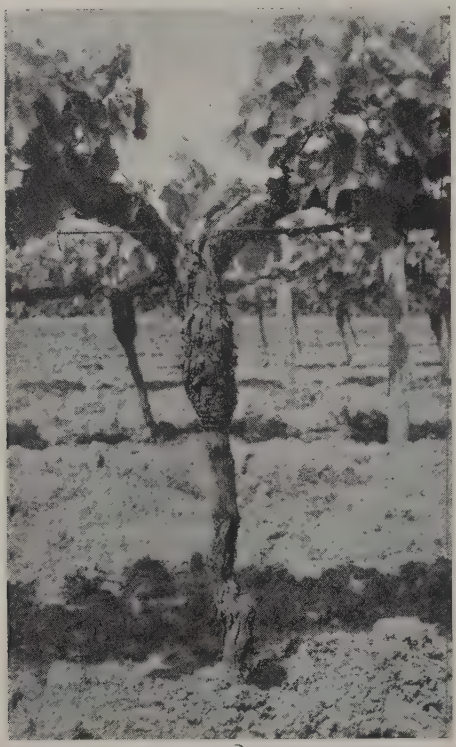

Fig. 1.—A cinctured currant vine showing an expansion in stem girth above the cincture cuts

The next major research project was to test the effect of eliminating cincturing, on the health and longevity of the currant vine. Before proceeding to deal with hormone spraying of currants let us very briefly summarise the findings of the main investigation.

Under present conditions in the Swan Valley vineyards fertiliser deficiencies are of less practical importance than such influences as management practices, the effective root zone and soil water relationships. It is apparent that any management practices that will improve the growth and efficiency of the observed deteriorated root system of the problem vines will result in some improvement in yield and vigour. Replanting after a period under undisturbed pasture, rather than immediate replanting, was recommended as a solution to the replant problem pending further research findings.

This procedure, as well as being thought to minimise the incidence of diseases and pests which built up under continual grape growing, was shown to have greatly improved the soil organic matter status and the physical condition of the soil.

A survey in 1952 indicated that the vigour of vines could be correlated with the organic matter contents of the surface soil and that continual cultivation had practically halved the organic matter of the lighter surfaced soils.

CINCTURING OF CURRANTS

The cincturing of currant grape vines at flowering time has been adopted as the standard method for improving fruit set since its introduction from Greece into Australia by Catton Grasby in 1897.

An important commercial characteristic of this variety is that it is normally seedless. In the absence of seeds the nutritional effect of cincturing is necessary to induce a satisfactory berry development. Cincturing involves the complete removal of a narrow strip of bark (the phloem), usually about $\frac{1}{8}$ of an inch thick, from the trunk of the vine. It is claimed that optimum results are obtained if the cincture is applied when the grape flowers are in full bloom and have shed about 80 per cent of the floral caps. Locally this would be early in November.

It is generally believed that the phloem cincture restricts the movement of soluble nutrients to the roots and results in a temporary increased supply to the bunches, wood, and shoots.

During the investigation into the deterioration of replant currants it was observed that cincturing may cause a rapid deterioration in a weak vine, especially during periods of moisture stress. It was thought that one of the possible factors in the rapid decline of these problem currant vines was that cincturing damaged the conducting tissue and also restricted the flow of nutrients to an already weakened root system.

HORMONE SPRAY TRIALS 1951-1952 SEASON

Hormone Sprays Used November, 1951.

Many synthetic plant growth regulators have been tested experimentally in this field but the early work of Coombe in South Australia and Antcliffe at the Merbein Research Station, Victoria, suggested confining our experimentation to two types of hormone spray namely:—

(1) 2,4-dichlorophenoxyacetic acid (2,4-D).

(2) parachlorophenoxyacetic acid (P.C.P.A.).

The prime purpose of the use of the sprays was to measure the effect of the elimination of cincturing on the vigour and longevity of the currant grape vine.

Fig. 2.—The unhealed cincture cut on a weak currant vine

Quantities and Concentrations Applied.

The ethyl ester of 2,4-D was used. The 2,4-D spray was applied at the rates of 4, 2 and 1 pints per vine which is approximately equal to 200, 100 and 50 gallons per acre. The concentration of 2,4-D was $2\frac{1}{2}$ parts per million.

It was found that for our normal-sized vines, 100 gallons per acre gave a thorough foliage and bunch cover. Two hundred gallons per acre was wasteful of spray, while 50 gallons per acre necessitated confining the spray to the main body of the vine where the fruit bunches are carried. Apart from normal leaf distortion, no damage was done to the vines with 2,4-D at $2\frac{1}{2}$ parts per million and up to 4 pints to the vine.

The acid form of P.C.P.A. was used Difficulty was experienced in making up a concentrated stock solution in water and alcohol was used as the solvent for the stock solution which was diluted with water for use as a spray. For this reason only, in later years the readily water-soluble sodium salt was used. Both forms are equally effective.

The P.C.P.A. spray was applied at 100 and 50 gallons per acre at a concentration of 50 parts per million. Various sites were also sprayed with P.C.P.A. at 20 parts per million at quantities varying from 50 to 75 gallons per acre depending on the size of the vines.

Hormone Damage.

Serious damage was confined to one treatment, namely P.C.P.A. at 50 parts per million and at 100 gallons per acre. It is thought that damage resulted because of the method of application. In an attempt to apply 2 pints per vine without losing spray on to the ground the foliage, canes, and arms were thoroughly drenched. Spray ran down erect canes and collected at the base of the cane and the bark of the arms absorbed abnormal amounts of spray. Apart from normal leaf distortion no ill-effects were seen on these vines until eight months later when at the break of dormancy and just before pruning time many canes split, became "corky" and died. The arms at the same time produced a lot of corky bark and, in some cases, died back. This resulted later in the production of a lot of barren shoots. Damaged vines left unsprayed and uncinctured the following season recovered their vigour while those sprayed with P.C.P.A. at 20 parts per million and 50 gallons per acre made a less complete recovery. The effect of cincturing following hormone damage was not tested. A block of treatments left unsprayed and

Fig. 3.—P.C.P.A. at 20 parts per million is the only treatment that is a commercial success. Left bunch—2,4-D at 2½ p.p.m.; centre bunch—1st year of cincturing; right bunch—P.C.P.A. at 20 p.p.m. These bunches are from three-year-old, very strong currants grown on fertile river flat. (T. C. Wilson—1951-52 season)

uncinctured the following season indicated that there can be a residual effect of hormone from one season to the next. The berries formed were intermediate in size between cinctured and uncinctured vines but they shed easily at picking time. There appeared to be a differential response depending on the concentrations and gallonage applied the previous season. However it must be remembered that the high concentrations, high gallonages, and methods of application are not those now recommended for commercial use. The available local evidence is that for up to four seasons, if the spray is applied properly, the vines are no easier or harder to set than at the commencement of spraying.

At some sites, especially on young vigorous vines, 2,4-D at 5 parts per million resulted in damage to the bunches.

Foliage Spray Versus Bunch Spray.

On all treatments fruit bunches were bagged to prevent the direct contact of the spray in order to test the necessity for hitting each bunch. The bagged bunches set very well but the berry stalks were thin and flexible like cinctured currants. It was therefore concluded that spraying the bunch was the most effective method and would be important where greatest activity was needed.

This was later confirmed next year in a trial with strong currants in which P.C.P.A. at 20 parts per million was superior to P.C.P.A. at 10 parts per million. At this site, with the lower concentration, any bunches not actually hit with the spray gave a very poor set.

In this last season it has been shown that by wetting bunches only with a small hand spray and placing no spray at all on

the foliage the fruit was set equal to normal spraying. This method used about 8 to 10 gallons to the acre instead of the standard 50 gallons to the acre.

RESULTS AND OBSERVATIONS, 1951-1952 SEASON

For a period of about a forthight to a month after cincturing, the cinctured vines were paler in colour and leaf growth stopped. Hormone-treated and uncinctured vines showed continuous growth and remained a fresh, dark green colour.

A characteristic leaf distortion occurred on young foliage and growing tips. Even new shoots growing after the spray application may show distortion and elongation. The berry stalks became thickened and more rigid as a result of hormone treatment.

2,4-D at 2½ parts per million was not usually successful on young very vigorous vines. Old and less vigorous vines set fruit about equivalent to cincturing.

P.C.P.A. at 50 and 20 parts per million set fruit, at least equivalent to cincturing, on both weak and vigorous vines.

Generally speaking the hormone-treated vines produced bigger and softer berries, delayed ripening and tended to give a reddish tinge to the fruit. However the dried fruit was graded and hormone-treated fruit compared more than favourably with the cinctured fruit.

The vigour of the vines increased under hormone treatment and, in some cases, up to double the weight of pruning wood was produced when compared with adjacent cinctured vines.

HORMONE SPRAY TRIALS, 1952-1953 SEASON

Twelve sites were selected covering a wide variety of conditions. The plan of layout at each site was six treatments replicated four times. The quantity of spray was standardised at 1 pint per vine. In actual practice the quantity was up to 1 pint per vine because where very weak vines were involved only enough spray was applied to wet the bunches. Where very leafy and strong vines were encountered more care was taken in the movement and direction of the nozzles so that bunches were wetted and spray was not shed onto the ground by the shielding action of the leaves. Both sides of the vine were sprayed to minimise the chances of missing bunches and some attempt was made, within practical limits, to omit spraying young growing tips which so readily show leaf distortion from the effects of hormone.

Fig. 4.—2,4-D is inferior to P.C.P.A. for strong young vines. Left pair of bunches—2,4-D at 2½ p.p.m. yielding aprox. 5 cwt. per acre of fresh fruit; right pair of bunches—P.C.P.A. at 20 p.p.m. yielding approx. 35 cwt. per acre of fresh fruit. The first crop on strong three-year-old replants. (T. J. Woolcott—1951-2 season)

SEASONAL OBSERVATIONS—1952-1953

Cinctured Vines.—Although initial berry development was much slower than hormone spray, the berries finally ripened earlier. Pale foliage colour extended in some cases up to two months after cincturing. Leaf scorch and moisture stress were more apparent in experimental cinctured vines than in those sprayed.

2,4-D Treated Vines.—The concentrations used were 2½ and 5 parts per million. The fruit set on late flowering bunches was inferior. A lot of green undeveloped berries were produced. 2,4-D at 5 parts per million was inferior to 2½ parts per million and on vigorous vines bunch damage occurred.

P.C.P.A. Treated Vines.—The more soluble sodium salt was used. Fruit set was very good under all conditions. Apparently more latitude is allowable with P.C.P.A. in regard to stage of flowering for successful fruit set than is possible with 2,4-D. Except for very strong vines P.C.P.A. at 10 parts per million and at 1 pint per vine (50 gallons per acre) gives satisfactory results.

Table 1.

HORMONE EXPERIMENTS WITH CURRANTS.

Yield Data—1952–53 *Season*.

Treatments.	Dry Weights (cwts. per acre).	Drying Ratio.	Classification.
T. C. Wilson, Caversham—4-year-old very strong vines.			
A—Cinctured	27·5	3·5	3
B—2, 4–D (2½ p.p.m.)	18·3	2·9	2·5
C—2, 4–D (5 p.p.m.)	17·7	2·7	2
D—P.C.P.A. (40 p.p.m.)	29·8	3·4	2·5
E—P.C.P.A. (20 p.p.m.)	30·8	3·2	3
F—P.C.P.A. (10 p.p.m.)	21·1	2·8	4
Statistical Data for Dry Weight— P·05 = 4·8 cwts. per acre. P·01 = 6·7 cwts. per acre.			
W. H. Taylor, Caversham—5-year-old weak vines.			
A—Cinctured	17·8	3·0	3
B—2, 4–D (2½ p.p.m.)	23·9	2·5	2
C—2, 4–D (5 p.p.m.)	24·2	2·5	2
D—P.C.P.A. (40 p.p.m.)	27·7	3·0	3
E—P.C.P.A. (20 p.p.m.)	31·9	2·9	3
F—P.C.P.A. (10 p.p.m.)	27·2	2·3	3
Statistical Data for Dry Weight— P·05 = 5·1 cwts. per acre. P·01 = 7·0 cwts. per acre.			

Table 1—*continued.*

HORMONE EXPERIMENTS WITH CURRANTS—*continued.*

Yield Data—1952–53 *Season—continued.*

Treatments.	Dry Weights (cwts. per acre).	Drying Ratio.	Classification.
A. R. Hill, Bindoon—12-year-old weak vines.			
A—Cinctured	19·6	2·0	2·5
B—2, 4–D (2½ p.p.m.)	11·4	2·0	2·5
C—2, 4–D (5 p.p.m.)	12·4	2·0	2·5
D—P.C.P.A. (40 p.p.m.)	19·2	1·6	3·5
E—P.C.P.A. (20 p.p.m.)	17·8	1·9	2·5
F—P.C.P.A. (10 p.p.m.)	16·4	1·8	3
Statistical Data for Dry Weight— P·05 = 3·8 cwts. per acre. P·01 = 5·2 cwts. per acre.			
N. K. Waldeck, Caversham—Old weak vines.			
A—Cinctured	20·8	2·5	2
B—2, 4–D (2½ p.p.m.)	25·6	2·5	2
C—2, 4–D (5 p.p.m.)	25·7	2·3	2
D—P.C.P.A. (40 p.p.m.)	25·6	2·3	2
E—P.C.P.A. (20 p.p.m.)	24·7	2·3	2
F—P.C.P.A. (10 p.p.m.)	21·4	2·3	2
Statistical Data—No significant difference between treatments.			
J. E. Anderson, Upper Swan—Old average vines.			
A—Cinctured	31·7	1·9	3
B—2, 4–D (2½ p.p.m.)	25·5	1·7	2·5
C—2, 4–D (5 p.p.m.)	24·9	1·8	2·5
D—P.C.P.A. (40 p.p.m.)	35·5	1·8	4
E—P.C.P.A. (20 p.p.m.)	32·3	1·8	3·5
F—P.C.P.A. (10 p.p.m.)	31·4	1·9	3
Statistical Data—No significant difference between treatments.			
St. Alban's Vineyard, Upper Swan—Old weak vines.			
A—Cinctured	20·6	2·1	3
B—2, 4–D (2½ p.p.m.)	23·3	1·9	2
C—2, 4–D (5 p.p.m.)	16·2	2·0	2·5
D—P.C.P.A. (40 p.p.m.)	21·3	2·1	2·5
E—P.C.P.A. (20 p.p.m.)	22·4	2·0	2·5
F—P.C.P.A. (10 p.p.m.)	20·3	2·0	2·5
Statistical Data—No significant difference between treatments.			

Remarks on Table 1.

The first three properties tested showed, on statistical analyses, significant differences between treatments. On no occasion were treatments D and E (P.C.P.A. at 40 and 20 parts per million) significantly worse than treatment A (cincturing). At W. H. Taylor's site all P.C.P.A. treatments were better than cincturing. On all three areas, 2,4-D at 2½ and 5 parts per million

(treatments B and C) were significantly inferior to P.C.P.A. at 20 parts per million. On T. C. Wilson's and A. R. Hill's experiments 2,4-D was also inferior to cincturing and P.C.P.A. at 40 parts per million.

The three remaining trials showed no significant differences between treatments. Another two sites were harvested but due to the great variation between plots no conclusions could be drawn in respect to the effect of treatments on yields. On deteriorated problem currants at D. E. Thorn's Millendon, the fruit set was satisfactory under all hormone treatments, but plot yields varied from 3 to 15 cwts per acre of dried fruit. An experiment on old strong currants at A. de Marchi's vineyard at Bindoon similarly gave a good fruit set with all hormone treatments and here plot yields varied from 15 to 40 cwts. per acre of dried fruit.

The drying ratio is estimated from the ratio of fresh fruit picked to the weight obtained after drying. Their variability indicates the necessity for dry weight yields.

The fruit was classified before cleaning to measure the quality of the fruit from each treatment. Under this scheme a classification of 1 would pack mostly 4-crown currants; 2 mostly 3-crown; 3 mostly 2-crown and 4 mostly 1-crown. Thus the higher the classification the poorer the quality. Half numbers are introduced because of the averaging of 4 lots and because in some cases samples were intermediate between two classes.

For all practical purposes the table shows that P.C.P.A. at 20 parts per million will set currants as effectively as cincturing under a wide range of conditions and that quality is not impaired.

It also illustrates the point that 2,4-D is erratic in its effects and cannot locally be recommended for strong vines. There is a tendency for 2,4-D to produce better quality fruit but to what extent this is influenced by lower yields or smaller berry size has not been ascertained.

HORMONE SPRAYING DEMONSTRATED TO GROWERS

After two years of experiments a lecture and field demonstration was organised early in November, 1953, to acquaint growers with results. At this demonstration the following recommendations were given:—

(1) Use P.C.P.A. at 20 parts per million.

(2) Concentrate the spray on the bunches and aim to wet the fruit thoroughly. Avoid if possible young growing tips.

(3) Use 1 pint of spray per normal-sized vine (50 to 55 gallons per acre).

(4) Spray both sides of the vine.

(5) Apply the spray at what would normally be cincturing time, that is when the grape flowers are in full bloom and have shed about 80 per cent. of the floral caps.

Within the next month, at least 2,000 acres out of a total of 3,000 acres of currants were hormone sprayed. In the next season the acreage sprayed rose from about 60 per cent. to at least 95 per cent.

As a general recommendation to cover all conditions the method has not been substantially altered.

Many growers claim better results when the spray is applied when all the caps have fallen and this does seem to reduce the retention of small green berries. However for all practical purposes there is quite a degree of latitude permissible in regard to time of application to obtain a reasonable set.

The gallonage recommended is only a guide and the more accurate direction would be the quantity of spray necessary to wet the bunches.

Investigations of reported damage from currant-setting hormone spray suggests the importance of not spraying twice; not drenching the canes and arms; applying the minimum quantity necessary by aiming for the bunches; not drenching small young vines, and not spraying replants and "layers" until they are ready to crop. There have been a few reported cases of the death of spurs supposedly as a result of hormone spray. If this is so then the experimental results suggest a faulty technique of application as a probable cause.

Fig. 5.—P.C.P.A. gives bigger berries. Left bunch—cinctured; centre bunch—2,4-D at 2½ p.p.m.; right bunch—P.C.P.A. at 20 p.p.m. These bunches are from four-year-old replant currants. (W. H. Taylor—1951-2 season)

HORMONE SPRAY TRIALS, 1953-1954 SEASON

Results and Observations.

This season the currant crop was severely damaged by rain. The first showers in many cases damaged the cinctured fruit most severely because it was compartively more mature and was at a more susceptible stage. However later showers also damaged the hormone treated fruit and a final inspection showed equal damage between treatments within the experimental trials.

Before harvest hot dry weather was encountered and the cinctured vines showed more leaf scorch and moisture stress. The fruit on cinctured vines shed badly both prior to picking and at picking time and in some cases up to half the fruit showing was lost onto the ground. It was noticed that on the hormone treated fruit the berry stalk was greener and tougher than cinctured fruit which probably accounted for its better retention.

It was fortunate that two-thirds of the Swan Valley currant crop was hormone-treated in this year or otherwise yields would have been appreciably reduced. Under these conditions hormone-spraying allowed picking to continue over a longer period instead of being a rush job.

In the trials 2,4-D at 5 parts per million was omitted because of its damaging effect and 2,4-D at 1¼ parts per million substituted.

On strong, vigorous vines, 2,4-D at 2½ and 1¼ parts per million gave a poor set and P.C.P.A. at 10 parts per million was again inferior to 20 and 40 parts per million.

On weaker vines, P.C.P.A. at 40, 20 and 10 parts per million and 2,4-D at 2½ and 1¼ parts per million set fruit successfully. 2,4-D at ⅝ parts per million was tried at one site and proved successful.

THE EFFECT OF CINCTURING AND HORMONE SPRAY ON PRUNING WOOD

It has been observed that, generally speaking, hormone spraying instead of cincturing has improved the quality and quantity of the pruning wood. The greatest deterioration in pruning wood has been recorded in vines where cinctured currants have shown severe leaf scorch before picking time and consequently lowered leaf activity whilst the adjacent hormone treated vines continued active growth.

To illustrate the type of results obtained, some weights and chemical analyses of pruning wood are reported in Table 2.

From the exploratory trial laid down in 1951 on the property of H. E. Bailey at Caversham the total pruning wood from

single vines was obtained in July, 1954, from three different treatments. The canes from each individual vine were separated into three classes and analysed for nitrogen, phosphorus and potassium. In selecting the three types of canes from each vine we followed the practice of growers who prefer average-sized canes (0.3 to 0.4 of an inch in diameter) to leave as spurs when pruning. It is the general practice to cut out weak canes and strong canes when pruning. The total amount of the three essential major elements was then calculated from the weight of wood produced and the percentage of each element in this wood. The moisture content of this newly pruned wood was approximately 50 per cent.

COMMENTS ON TABLE 2

It appears from these preliminary samplings that at this site, and under the climatic conditions prevailing during the 1953-54 season, cincturing has lowered the content of nitrogen, phosphorus and potassium in the canes. An investigation is under way to gather more detail on this aspect. Contrary to our expectations there is very little difference, chemically, between weak, average and strong canes.

Because there are approximately 450 vines to the acre the figures given as "weight of canes in grams" can be read directly as pounds per acre.

The hormone-sprayed vine grew pruning wood equivalent to 755 lb. per acre, the uncinctured vine 1,048 lb. per acre and the cinctured vine gave the comparatively low figure of 370 lb. per acre. These weights for single vines are in agreement with the pruning wood figures obtained over the last four years from the whole exploratory trial.

The character of the canes differs between treatments. The cinctured vine had 31 per cent. by weight of weak canes as compared with 15 per cent. and 18 per cent. in hormone-treated and uncinctured vines.

The hormone-sprayed vine has the equivalent of 3.4 lb. of nitrogen per acre in its canes, the uncinctured 3.7 lb. and the cinctured 1.4 lb. For phosphorus the corresponding figures are 0.4, 0.5 and 0.14 lb. of phosphorus per acre in the canes.

Table 2.

WEIGHT AND COMPOSITION OF PRUNING WOOD.

Comparison of Three Treatments.

	Weight, in Grams.	Percentage of Total Weight.	Cane Analyses.			Total Uptake, in Grams.		
			Nitrogen.	Phosphorus.	Potassium.	Nitrogen.	Phosphorus.	Potassium.
Hormone - Sprayed Vine—			%	%	%			
Weak canes	116	15	·84	·10	·71	·487	·058	·412
Average canes	226	30	·97	·11	·60	1·096	·124	·678
Strong canes	413	55	·87	·11	·67	1·796	·227	1·384
Total	755	100	....	....	....	3·379	·409	2·474
Uncinctured Vine—								
Weak canes	185	18	·94	·10	·63	·870	·093	·583
Average canes	405	38	·95	·10	·66	1·923	·203	1·336
Strong canes	458	44	·86	·09	·64	1·970	·206	1·466
Total	1,048	100	....	....	....	3·763	·502	3·385
Cinctured Vine—								
Weak canes	115	31	·75	·08	·46	·432	·046	·264
Average canes	129	35	·78	·08	·41	·503	·051	·264
Strong canes	126	34	·77	·08	·45	·485	·050	·284
Total	370	100	....	....	....	1·420	·147	·812

The most marked differences are in the potassium figures. The hormone-sprayed vines laid down in their canes, potassium equivalent to 2.5 lb. per acre, the uncinctured vines 3.4 lb. while the cinctured vines gave the low figure of 0.8 lb. of potassium per acre.

Although no detailed study has been made of the root systems of these experimental vines, because of the magnitude of such a project and the interference of such a study with an established experiment, it is thought that the responses in vigour and chemical composition of the canes must basically be the result of improved root growth when cincturing is eliminated.

Without going into a detailed discussion it may be stated briefly that to fit the known facts gathered over a period of some 12 years on the problem of deteriorated vines it is most likely that the poorer wood growth and limited nutrient absorption shown by the cinctured vine is due to cincturing further depressing an already weakened root system. Vines which show moisture stress before picking time as a result of cincturing are particularly prone to grow weak pruning wood.

The analytical data could also explain to some extent the seasonal occurrence of leaf symptoms of suspected potash, manganese and zinc deficiencies in cinctured currants on certain areas, the inability of applied fertilisers to fully control these suspected deficiencies and the elimination or improvement of these leaf symptoms when hormone-spraying replaces cincturing.

HORMONE SPRAY TRIALS, 1954-1955 SEASON

The gathering of yields this year was again complicated by heavy rain followed by flooding around picking time. However, the routine observations were made and yields were obtained from a few experimental sites which were picked early and escaped serious rain and mould damage.

These observations confirmed the findings of previous years in respect to fruit setting and only new findings will be briefly discussed and the results given from an area where harvest data is complete and where a marked deterioration has occurred on the cinctured vines.

Materials Included with Hormone Spray.

A trial at the Upper Swan Research Station on weak currants, yielding about 8 cwts per acre of dried fruit showed that "Ziram" and "Spersul" at 3 lb. per 100 gallons either singly or combined could

Fig. 6.—Bunches bagged when spraying with P.C.P.A. at 50 p.p.m. set as well as unbagged bunches. Left bunch—cinctured; centre bunch—P.C.P.A. at 50 p.p.m.; right bunch—vine sprayed with P.C.P.A. at 50 p.p.m., but this bunch bagged to prevent being hit by spray. Fruit setting equivalent to centre bunch but berry stalks much thinner. These bunches from 12-year-old weak replant currants. (W. H. Taylor—1951-2 season)

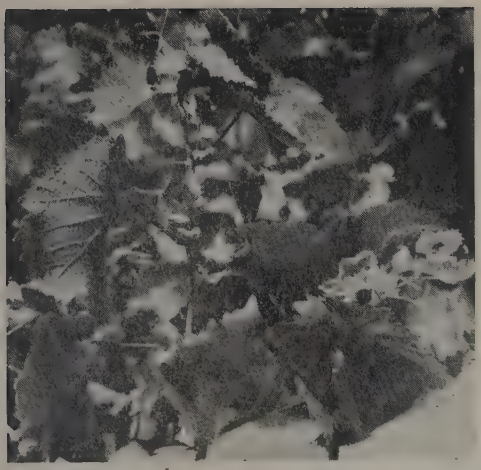

Fig. 7.—Hormone spray causes leaf distortion on young actively-growing shoots. Note leaf distortion at right hand side of photograph and that mature leaves are unaffected. This amount of leaf distortion is a normal consequence of the hormone spraying of vigorous currant vines and is not regarded as harmful

be included with the routine hormone spray without affecting the efficiency of the fruit set. Commercial manganese sulphate at a concentration of 2 per cent. in the spray did not interfere with fruit setting. The included manganese improved leaf colour and vine vigour, but hot dry weather in January caused severe leaf scorch and this early advantage was lost. The yields show no significant benefit from manganese spray. In error, these inclusions were added at double the rates originally planned.

It has not yet been ascertained whether these results would also apply to strong vines which are more difficult to set.

Method of Application of Hormone Spray.

In order to compare the normal bunch and foliage-spray method with spraying bunches only, a trial was laid down on the Upper Swan Research Station on weak currants yielding about 8 cwts per acre of dried fruit.

The normal method of spraying with a knapsack (aiming at the bunches and applying a pint per vine of P.C.P.A. at 20 parts per million) was compared with spraying the bunches only and avoiding the leaves. The same yield and quality of fruit was obtained from both methods.

This type of trial has not yet been duplicated on vigorous vines which are usually more difficult to set.

The purpose of the trial was to further demonstrate to growers that for safe and satisfactory hormone-spraying it is of prime importance to wet the bunches and that although, in practice, a foliage cover cannot be avoided, it is not essential for fruit setting.

Time of Application of Hormone Spray.

In another trial at the Upper Swan Research Station, it was found that quality and yields were the same when spraying was spread over a ten-day period. The experimental vines were weak vines yielding about 13 cwts. per acre of dried fruit.

The stages of flowering in the four successful sprayings were as follows:—

1st Spray.—Half the bunches have flowered with 20 per cent. of floral caps off.

2nd Spray.—Three quarters of the bunches have flowered with 50 per cent. of floral caps off.

3rd Spray.—Full bloom and 80 per cent. of floral caps off. This stage usually taken as the normal time for cincturing and about this stage or slightly later is that favoured locally for hormone-spraying.

4th Spray.—Berries clear and the size of match heads.

Two weeks after the recommended time, the berries were the size of wheat grains and a week later the berries were the size of large wheat grains. When sprayed at these two later stages, the yield and quality was much inferior.

These results are in agreement with information gained in the 1952-53 season when it was observed that P.C.P.A. sprayed a week before and a week later than normal cincturing time gave a satisfactory set. The observations that year indicated that there was not the same latitude with 2,4-D.

Hormone Spray Trial at Bindoon, 1954-1955.

This trial was laid down in November, 1952, and has been in existence now for three seasons. The first year's results are reported in Table 1, under the name of A. R. Hill, Bindoon.

The cinctured vines in this experiment have consistently shown pruning wood which is much inferior in quality and quantity to that found on the hormone-treated vines. When the vines were sprayed or cinctured early in November, 1954, it was observed that the cinctured plots were very backward in growth. The cinctured vines showed pale green foliage colour up to at least six weeks after cincturing. Early in January, 1955, hot dry weather caused severe foliage scorch only on the cinctured vines.

At pruning time there was an obvious difference in the quality and quantity of the pruning wood on cinctured as compared with hormone-treated vines. The wood from cinctured vines was described as weak wood with a grey-brown colour, while wood from the vines in all hormone treatments was good strong wood with a golden-brown colour.

Table 3.

HORMONE EXPERIMENT WITH CURRANTS.

A. R. Hill, Bindoon.

Yield Data—1954–55 *Season.*

Treatments.	Dry Weights (cwts. per acre).	Classification.	Weight of Pruning Wood (lb. per plot).
A—Cinctured	8·1	5	3·9
B—2, 4–D (2½ p.p.m.)	16·1	4	8·6
C—2, 4–D (1¼ p.p.m.)	17·2	5	10·5
D—P.C.P.A. (40 p.p.m.)	15·3	5	10·8
E—P.C.P.A. (20 p.p.m.)	19·1	4·5	10·9
F—P.C.P.A. (10 p.p.m.)	17·1	4·5	10·1
Statistical Data—			
P·05	5·4	....	2·5
P·01	7·5	....	3·4

REMARKS ON TABLE 3

The drying ratios are not included in the table as they are very uniform between treatments and approximate a figure of 2.5. The yields from all hormone treatments are significantly better than the yields from cinctured vines. There is no difference this year between the various hormone treatments, although in the first year 2,4-D was inferior to P.C.P.A.

The increased yield obtained from hormone-spraying is worth an additional £36 an acre. To this saving must be added the increased labour cost of barking and cincturing vines.

There is a significant difference between the weight of pruning wood obtained from cinctured vines compared with that obtained from hormone treated vines. The average weight of pruning wood on a cinctured vine was 1.3 lb. which would be equivalent to approximately 585 lb. of pruning wood per acre. This low state of vigour does not hold much promise for the economic future of these cinctured vines.

The fruit was classified before cleaning. The method of classification differs from that previously in use at the packing sheds as quoted in Table 1. In Table 3 a classification of 4, means in effect that on cleaning the sample would pack mostly 3-crown currants, while a classification of 5, means that it would pack mostly 2-crown currants. Once again, the hormone-treated fruit was found to be at least as good, or even better in quality than the cinctured fruit.

CURRANT VARIETIES AND HORMONE INJURY

It has been assumed that our currants were identical with the Zanté currants of Greece. However, Dr. H. P. Olmo, a visiting Fulbright Scholar and a specialist in viticulture, has drawn our attention to the fact that the currant vines grown locally are not the same as the Zanté currant grown in California. Dr. Olmo also suggests that the variety of currant known locally, for want of a better name, as "the grey hairy currant," is probably identical with the original Zanté currant of Greece and the variety grown in America. Futhermore, he also suggests that the currant grown commercially in Australia was an importation from South Africa and is probably identical with the variety known as the "Cape" currant.

The practical significance of this difference with respect to hormone setting is that locally where a "grey hairy currant" has been sprayed with P.C.P.A. at 20 parts per million, it was found to be much more sensitive to hormone damage than our normal currant.

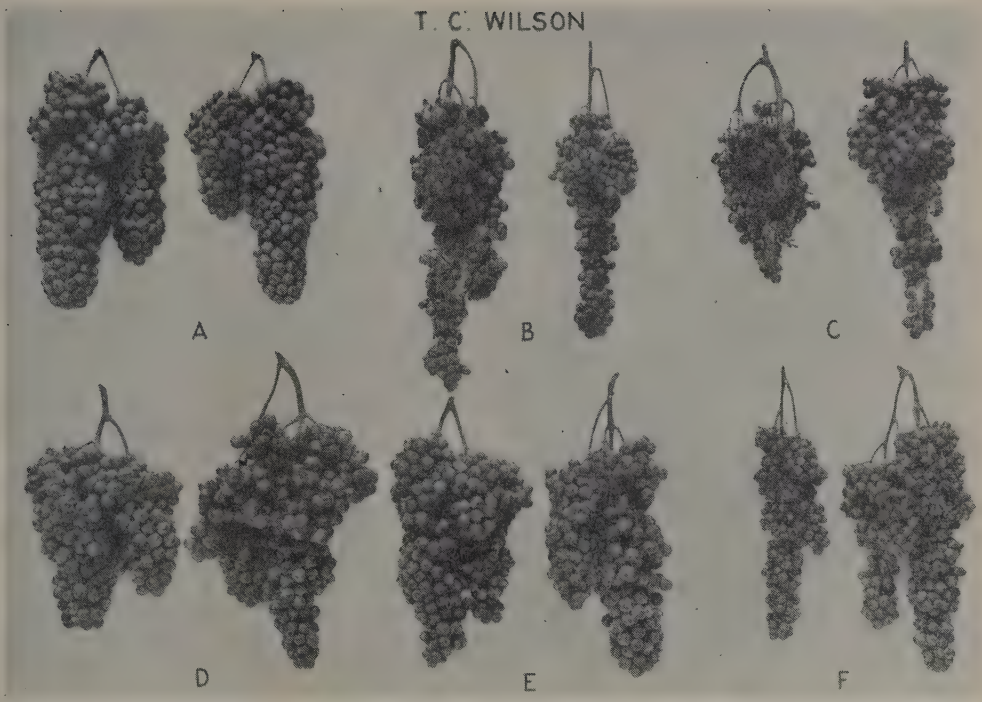

Fig. 8.—Illustrating the failure of 2,4-D and P.C.P.A. at 10 parts per million to set very strong four-year-old currants. The treatments are as follows:—A—cinctured; B—2,4-D at 2½ p.p.m. (note poor set and some hormone damage on one bunch); C—2,4-D at 5 p.p.m. (note poor set, and severe hormone damage, green undeveloped berries and thickened berry stalks, on one bunch); D—P.C.P.A. at 40 p.p.m.; E—P.C.P.A. at 20 p.p.m.; F—P.C.P.A. at 10 p.p.m. (note poor fruit set, smaller berries and presence of green undeveloped berries Although not apparent in the photograph the berry stalks are thinner than in the other hormone treatments). (T. C. Wilson—1952-3 season)

Therefore, until further knowledge is gained on this varietal difference, it would be as well to restrict the findings of this investigation to the variety of currant grown locally, which is probably identical with the Cape currant.

This difference in varietal response to hormone injury may explain why it has not yet been possible to make a commercial recommendation in California, even though fruit setting with growth regulators has been studied there by R. J. Weaver and others for many years.

CONCLUSIONS

It has been demonstrated that P.C.P.A. at 20 parts per million will set currants as effectively as cincturing under a wide range of conditions and that yield and quality is not impaired. It was found that 2,4-D was erratic in its effects and could not be confidently recommended for strong vines.

All experimental vines showed an improvement in vigour, judged on leaf colour and vegetative growth, when hormone spray replaced cincturing. Vines which for various reasons show moisture stress and leaf scorch before picking time are those most seriously affected by cincturing. In such cases a marked decline in yield and vigour may occur.

Cincturing is one of the factors that has contributed to the vine deterioration problem in currants. However cincturing damage is still only one of the factors contributing to the decline of vines in the Swan Valley and long experience with the problem suggests that the part played by each factor, at each problem site, is best measured by the extent to which it affects root growth.

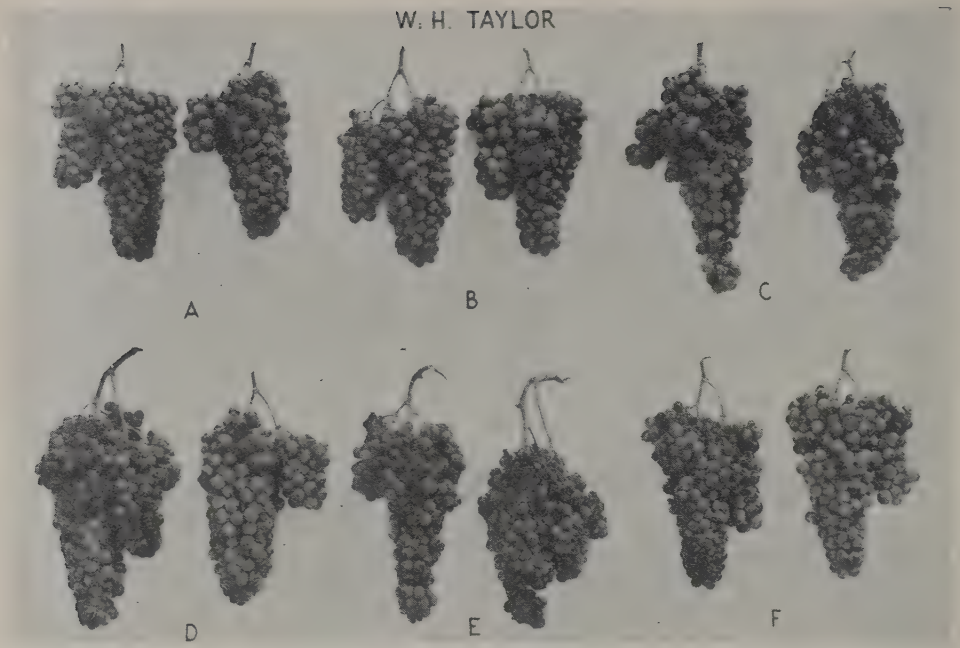

Fig. 9.—Illustrating the commercial success of all hormone treatments on five-year-old weak replant vines. The treatments are as follows:—A—cinctured; B—2,4-D at 2½ p.p.m.; C—2,4-D at 5 p.p.m.; D—P.C.P.A. at 40 p.p.m.; E—P.C.P.A. at 20 p.p.m.; F—P.C.P.A. at 10 p.p.m. (W. H. Taylor—1952-3 season)

ACKNOWLEDGMENTS

Mr. W. R. Jamieson assisted with the trials in the first year and Mr. C. R. Hale has taken an active part in the investigation since January, 1953. Various officers of the Plant Research Branch have assisted in spraying and harvesting operations.

Messrs. R. Haining and T. C. Wilson were responsible for the fruit classifications.

Thanks are also expressed to the many growers, of which only some are mentioned in the text, who made available experimental sites on their properties and assisted in the carrying out of the trials.

The chemical analyses reported were carried out in the Government Chemical Laboratories.

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STRYCHNINE POISONING IN DOGS

WHILE there is considerable variation in the reaction of different species of animals to strychnine, the dog is particularly susceptible. The early symptoms of strychnine poisoning are anxiety and restlessness, followed by twitching and violent muscular contractions. The dog remains fully conscious until death occurs from asphyxia.

The rapidity of the development of symptoms, and finally death, depends of course on the amount of strychnine consumed, but most cases are very rapid and immediate treatment is essential if the animal is to be saved.

Veterinary treatment is usually aimed at the expulsion of the stomach contents as quickly as possible, followed by an anaesthetic to control the convulsions. However strychnine is absorbed rapidly from the bowel and if convulsions are severe any attempt to cause the dog to vomit may be dangerous—the vomited material may enter the windpipe.

Apomorphine is usually injected by veterinarians in the early stages—this drug causes rapid vomition, following which Nembutal is given by intravenous injection to cause immediate anaesthetisation. The animal is kept anaesthetised until the convulsions have ceased.

Where veterinary attention is not readily obtainable treatment is difficult. Provided the animal is induced to vomit very soon after the swallowing of a bait and before sufficient strychnine has been absorbed into the blood stream its chance of recovery would be quite good. For this purpose reliance must be placed on drugs which are readily obtainable and easily given. Sulphate of zinc, common salt, and mustard are often used for this purpose but perhaps the most reliable emetic of this type is ordinary washing soda. One medium-sized crystal swallowed by the dog will generally induce vomiting quite rapidly.

An "outback" method of inducing vomiting, when no other emetics are available, is to push a wad of tobacco down the dog's throat as soon as it is known that he has taken a bait.

As convulsions can be brought on by any noise or movement every effort should be made to see that the dog is placed somewhere where noise will be reduced to a minimum.—J.S.

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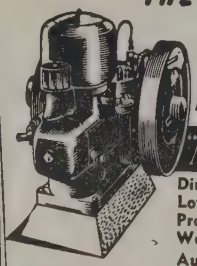

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STOP FIREBREAK EROSION

By B. a'B. MARSH, B.Sc. (Agric.), Soil Conservation Service Adviser

THOUGH it is generally realised that ploughed firebreaks are an erosion hazard, many farmers are forced to use the plough due to the lack of other more suitable machinery, or due to the presence of too much trash for a tyne implement to handle. Erosion damage is commonly caused by concentration of water down a long furrow and if this flow can be interrupted and diverted the hazard is not so great.

In order to obtain this effect, Mr. E. P. Hogben of Wickepin, uses a novel but effective method which could well be copied by other farmers. Every four or five chains while travelling uphill, Mr. Hogben turns a complete left-hand turn (see Fig. 1). This blocks out the furrow and water is diverted out along the bottom arc of the circle, the water thus being discharged in small quantities.

If there is a steep side slope to the right, the water would run back into the furrow. To avoid this it is necessary to plough as in Fig. 2.

While travelling downhill, it is more difficult to design a method for producing the same result unless the plough has a suitable automatic or screw lift. It is necessary to veer away from the fence at about 30 degrees till about 1½ chains from

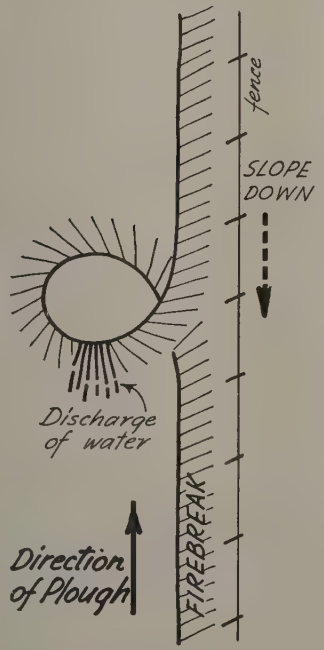

FIGURE 1.

TRAVELLING UPHILL & WITH DOWNHILL SIDE TO LEFT

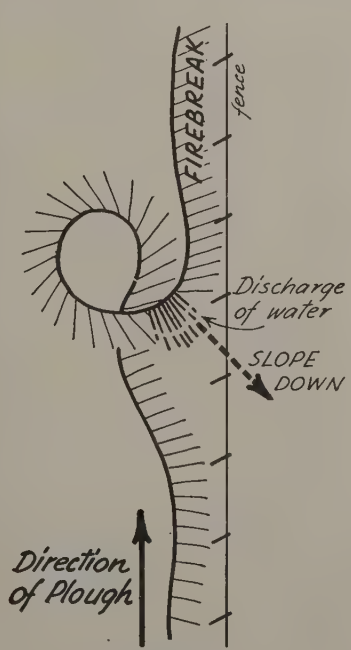

FIGURE 2.

TRAVELLING UPHILL BUT, WITH SLOPE TO THE RIGHT

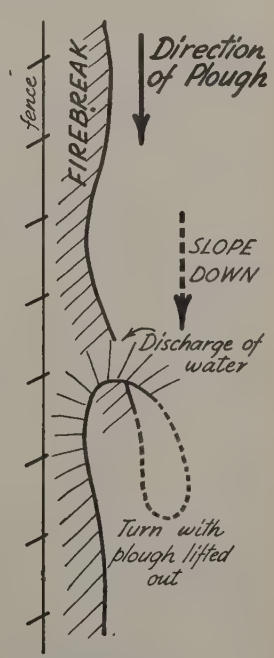

FIGURE 3.

TRAVELLING DOWNHILL

the fence, the plough is lifted out and after turning (see Fig. 3) the furrow is crossed with the plough dropped, while travelling in an uphill direction and the line then continues downhill. If two cuts are made the second cut only need be worked in this manner.

In contour banked paddocks, turn the circle above each bank so that the bank will handle the discharged water.

Firebreaks dependent on the cultivation and loosening of the soil to kill vegetation can be made with scarifier, disc harrows or plough. Of these, by using the methods suggested, the ploughed firebreak, only, can be made to cope with heavy summer rains. Probably the safest method is to use a formed road **with spur drains for water disposal.** A formed road can be kept clean with a scraper or plough. If all farm tracks are formed into built up roads and a road put around the boundary of the farm, there would be the benefit of permanent firebreaks and the comfort and convenience of a stable system of smooth roads to all parts of the farm. (See Bulletin No. 2133 dealing with farm roads, their construction and water control.)

Book Review.

METHODS OF SURVEYING AND MEASURING VEGETATION

By Dorothy Brown.

(Commonwealth Bureau of Pastures and Field Crops Bulletin No. 42, 1954. pp. 223. Obtainable from the C.A.B. Liaison Officer at 314 Albert Street, East Melbourne, C2. Price 43s. 9d.)

This book deals with methods of surveying and measuring the vegetation of grazing lands. Although limiting the work to grazing lands renders the title somewhat misleading, Miss Brown has so adequately covered the great range of types of vegetation that are used for pasture and so fully reviewed the extensive literature that the reader is offered a wealth of information on methods of measurement. Miss Brown emphasises that she has not attempted a critical evaluation of methods, yet she succeeds in indicating the types of pasture to which any particular method is applicable and makes useful comparisons with other methods which might be considered in such circumstances. This classification and comparison reviews the literature up to 1951, over three hundred papers being cited.

The methods are classified not primarily according to the type of vegetation on which they are employed but on the basis of botanical analysis, productivity, and utilisation. The book deals with (a) vegetation and its sampling; (b) botanical analysis, using the criteria of frequency of occurrence, number, area covered, and weight; (c) productivity, covering estimate of error, weight estimate, area and weight, actual weight, the animal as a measure, and pasture recording and regional surveys; and (d) utilisation, including weight, linear measurements, and reconnaissance methods. At most stages attention is directed to statistical considerations, and this critical attitude towards quantitative ecology permeates the whole book. Miss Brown has not only done an excellent job of collation but has done much to clarify the confusion of terms which has previously existed.

The work is so useful that it is to be hoped that the Bureau will be prepared to issue a supplement later. The present book will undoubtedly encourage a wider and more intelligent use of many methods and will stimulate work on critical comparisons of different methods.

We have come to expect a high standard of C.A.B. Bulletins. The present bulletin well maintains that standard. It is simply and easily written, printing and layout are good, and diagrams and figures are clear and informative. The book is a tribute to Miss Brown's ability and industry.

DISTEMPER IN DOGS

By J. SHILKIN, B.V.Sc., Veterinary Surgeon

CANINE distemper is the most serious disease of dogs in Western Australia and, indeed, throughout Australia and most other parts of the world. Many people both in the metropolitan area and in country districts, will have had personal experience with this disease with their own dogs and will know just how serious a condition it can be.

It is a disease that has been prevalent among dogs for a long period, and over the years its character has changed in some degree—and in some respects for the worse. However, it is possible that this change is due in part, at least, to the introduction into Australia of several viruses other than the true distemper virus. Research work is being carried out in an attempt to clarify the position in regard to these other conditions and it is hoped that eventually a clear picture will be obtained of the so-called distemper complexes.

For the purpose of this talk it will be less confusing if I confine myself to the straight out picture of distemper as it is usually seen by the dog-owner.

DESCRIPTION

Firstly it is an acute, highly infectious disease caused by a filterable virus. It is generally spread from one dog to another by direct contact but may also be spread by indirect means such as contact with an infected kennel or the consumption of food and water contaminated by the discharges of an infected animal.

Whilst it principally affects dogs between the ages of 3 to 18 months, it can affect younger animals if they are exposed to infection and older animals where they have previously not had the opportunity of contact. In this latter connection the disease is occasionally seen in quite old dogs which may have spent their life in remote country districts away from any contact with infection, before being brought to the city or nearer country areas and exposed to infection.

The incubation period of the disease—that is the time which elapses from exposure to infection to the appearance of symptoms—is usually about a week to ten days. However, symptoms may appear as early as the third or fourth day or they may be delayed for as long as three weeks.

SYMPTOMS

The earliest symptoms may be indefinite but the dog usually appears to be rather listless and either has a reduced appetite or will not eat at all. After a few days the symptoms may become more definite with a discharge of mucus and pus from the eyes and nose. Whilst the temperature at this stage is usually high the dog frequently shivers a good deal. These symptoms, in a young dog that has not been immunised, are fairly characteristic and as early treatment is important it is wise to assume that all such cases may in fact be distemper. Seek veterinary assistance where possible or commence your own treatment where this is not possible. At this stage it might be useful to mention a common mistake made by many dog owners who when they realise that the animal is "off colour" assume that worms may be responsible for the condition and treat accordingly. This treatment, by lowering the resistance of the dog, may in fact aggravate the symptoms of distemper so that worm treatment in the early stages of distemper—and of course at other stages—is definitely unwise.

As the disease progresses, the nose becomes hot and dry and may become blocked causing the dog to breathe through its mouth. The inflammation of the eyes—usually a conjunctivitis at first, is responsible for an increase in the discharge from the eyes and lids, and the eyes frequently become gummed up. The dog usually lies round most of the time at this stage but occasionally may have short periods of apparent brightness. In a small proportion of cases the disease does not progress very far and the animal improves quite quickly, regains its appetite and appears to be quite well. Generally, however, the condition becomes progressively worse and one or more of the various complications associated with the disease frequently appear. These consist of bronchitis, pneumonia, gastritis, enteritis or gastro-enteritis. Bronchitis is characterised by a pronounced cough particularly at night—pneumonia by laboured breathing and gastro-enteritis by tenderness over the abdomen, obvious abdominal pain, diarrhoea and sometimes straining.

In some cases, particularly if the resistance of the animal is high and the dog has been carefully nursed, recovery may result after three to four weeks. Such dogs of course have usually lost a good deal of condition and the convalescent stage may be slow. Recovery from such conditions as pneumonia and enteritis is much more likely if expert treatment is carried out particularly with some of the newer drugs avilable.

A symptom which is fairly common and which has been stated to be characteristic of distemper is the appearance of small yellow pustules on the abdomen. However, these are due to secondary infection by bacteria in an already weakened animal and are not necessarily characteristic at all.

In at least one-third of the dogs affected with distemper, nervous symptoms may devolop and whilst these generally appear after the infection has been present for three to four weeks they may occur within the first week or even up to seven or eight weeks from the time of infection. The severity or otherwise of the initial symptoms are not necessarily an indication as to whether nervous symptoms are likely to appear. Paralysis, particularly of the hind quarters, twitching of part, or the whole, of the body, and fits are most common types of nervous symptoms encountered. Blindness may also develop in a small proportion of cases.

TREATMENT

Even the most skilled treatment of animals affected with the disease will not necessarily ensure recovery. However, early treatment in the great majority of cases will result in recovery without any untoward ill effects and it should be obvious that wherever veterinary services are available they should be sought if distemper is suspected.

Treatment with any of the sulpha drugs —a practice that has been frequently adopted—is inadvisable. While these drugs do often appear to favourably affect the course of the disease for a time, it has been noticed by many veterinarians that dogs so treated will more frequently develop nervous symptoms and it is thought that sulpha drugs are responsible.

Penicillin and the newer antibiotics are widely used in the treatment of distemper and are extremely useful, but where veterinary attention is unobtainable, careful nursing is most important. Affected animals should be kept as quiet as possible and should under no circumstances be allowed exercise. They should be provided with clean, warm, dry, but well-ventilated quarters. The nose and eyes if necessary, should be kept free of discharges. The eyes may be bathed with a warm solution of boracic acid and the eye-lids smeared with boracic ointment to prevent gumming. If necessary the nostrils may be treated in the same manner to prevent drying and cracking. The appetite should be encouraged with nourishing, easily-digestible food such as milk, broth, minced beef and raw eggs. Food should be given in small quantities and at frequent intervals. On the other hand no attempt should be made to force food on an animal which resists.

In the control of distemper it is important to prevent contact between infected and susceptible dogs. This may be difficult in cities and towns where large numbers of dogs are kept, but in country districts avoidance of contact between dogs on neighbouring properties and in adjacent

towns should be possible. Newly purchased dogs should be isolated for approximately three weeks before being allowed to come in contact with other dogs on the property. If it is intended to introduce a new animal after an attack of distemper has occurred, it is desirable that bedding and other material which may have been in contact with infected dogs should be burnt and the kennels disinfected with a 5 per cent. lysol solution. In addition such kennels should be allowed to remain empty for three to four weeks.

Most of these measures can, however, be overcome by having all animals immunised against the disease. Until recently, the method consisted of giving the animal two injections at about three months of age—the dog was actually given an injection of the virus causing the disease, following which anti-distemper serum was given to control it. While this method of immunisation was quite effective, it had its dangers, in that injections given in the incubation period of the disease, for example, could lead to the devoloping of an attack of distemper. Care had to be taken too in isolating the dog for at least a fortnight to prevent transmission of the disease to susceptible dogs. Recently, however, a new type of vaccine which eliminates these disadvantages has become available. This is an egg-adapted vaccine which will not produce distemper in the dog but which will produce a good immunity. It consists of only one injection and pups can be vaccinated from eight weeks onwards.

Whilst it can be seen from the foregoing that distemper is a most serious and troublesome ailment, vaccination on a widespread scale could virtually result in the elimination of the disease. Wherever possible, therefore, young animals should be protected by this means.

(From a broadcast talk. Published by courtesy of the Australian Broadcasting Commission.)

THE MESQUITE MENACE

Mesquite, an introduced tree that has long been regarded with tolerance or even approval as a source of shade and fodder may become a serious menace to the pastoral and agricultural industries in the North-West.

This opinion was expressed by the Acting Minister for Lands and Agriculture (Mr. L. F. Kelly) when he returned from Carnarvon after attending a field day at the Gascoyne Research Station.

During his visit to Carnarvon the Minister inspected hundreds of mesquite trees growing in the township and was gravely concerned to note the rapidity of its spread over the past two or three years.

Mesquite trees had formed dense thickets in some areas, and isolated trees were seen as far out as the bridge over the Gascoyne River and were encroaching upon the irrigated areas where they could become a serious threat to tropical agriculture.

Mesquite, or algaroba, as it is sometimes called, is native to Mexico and the southern portions of the U.S.A.

Because it is hardy and drought-resistant and produces seed-pods which are both palatable and nutritious to livestock, the tree has been introduced into many countries, including Australia.

Most strains of mesquite carry sharp spines from half an inch to three inches in length, but some varieties are almost spineless and it is believed that most of the trees introduced into our North-West were originally spineless but have since reverted.

Professor W. Phillips, Professor of Botany at the University of Arizona, who is at present in Western Australia has graphically described the "explosive" nature of this plant. In Arizona where the tree is indigenous, it suddenly commenced to spread about 50 years ago and today 9,000,000 out of 15,000,000 acres of desert grassland in that State have been rendered useless by mesquite.

The tree develops a taproot which will go down 20ft or more in two years from the seedling stage and it also sends out a dense network of surface roots which make it impossible for grass to grow near the trees.

At Mardie Station near Onslow, mesquite has already taken possession of 36 square miles of pastoral country, choking out grasses and edible shrubs.

Every effort should be made to eradicate mesquite from the Carnarvon area, lest this district should prove a source of widespread infestations, said the Minister. Prompt action is needed while the infested area is small enough to be handled.

In America, despite the expenditure of thousands of dollars and the institution of extensive research programmes, no economical methods of eradicating mesquite had yet been evolved.

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Fig. 1.—A well-grown sample of Atlas barley which has been slightly over-threshed, damaging the awn end of the grain.

OATS AND BARLEY FOR THE EXPORT MARKET

By A. S. WILD, B.Sc. Agric., Acting Superintendent of Wheat Farming
and J. T. REEVES, B.Sc. Agric., Plant Geneticist

TODAY, with the accumulation of large stocks of wheat due to marketing difficulties, more attention is being paid to the growing of the two coarse grains, oats and barley. These are more readily saleable on the world's markets, at a price which gives a reasonable return to the grower.

Recently, there was published in this journal an article "Oats and Barley in Western Australia" (1). Included in this article were figures setting out the acreages sown to individual varieties, both oats and barley for the five seasons 1948/49 to 1952/53. The three leading oat varieties, in order of importance were Ballidu, Wongan and Dale, while the most popular barley varieties were Atlas (6-row), Prior (2-row) and Cape (6-row). It is anticipated that statistics will show that these are still the most widely grown varieties in this State.

In the following table the total grain yields for oats and barley are given for the three seasons 1951/52, 1952/53 and 1953/54. While production for 1954/55 is not yet fully known, the estimate for oats is 10,000,000 bushels.

GRAIN PRODUCTION IN BUSHELS.

Season.	Oats.	Barley (2-row).	Barley (6-row).	Total Barley.
1951–52	7,689,222	230,472	464,613	695,085
1952–53	10,439,880	380,808	1,361,568	1,742,376
1953–54	9,590,643	405,759	2,327,418	2,733,177

Fig. 2.—Ballidu oats. This is an excellent variety suitable for grazing, hay and grain. It is the most widely-grown variety in Western Australia.

OATS

Approximately 80 per cent of the total grain production of oats is consumed within the State; normally most of it being used for stock feed. The proportion used locally varies slightly from year to year depending both on seasonal conditions in Western Australia and also on the market price and subsequent realisation to the farmer.

The leading oat varieties Ballidu, Wongan and Dale are sown to 85 per cent. of the total oat acreage. They are general purpose varieties, being suitable for both grazing and subsequent recovery for grain and no doubt the majority of oats exported from this State consists of these three varieties. Their grain quality is normally quite satisfactory and they are therefore eminently suitable for the export trade. As less important oats, including Algerian and Fulghum, are principally grazing varieties, they would be of only minor importance in the grain trade. As it happens their grain is not as plump and attractive as that from the three major varieties.

For the export trade it is recommended that Dale (midseason maturing), Ballidu (early maturing) and Wongan (very early maturing) be grown. The grain quality of the new variety, Avon, has not yet been finally determined, although its awnless, light-coloured grain should be in its favour.

The principal overseas market for oats is the United Kingdom, where the grain is either milled for the manufacture of oat-

meal or is used for the feeding of stock. The Quaker Oat Company is usually a major overseas buyer. Small shipments are also sold to other European countries.

BARLEY

The local malting industry uses almost exclusively 2-row varieties, principally Prior and Maltworthy. Therefore, the total production of 6-row varieties is available for use either for stock feeding locally or for export to various overseas markets. The proportion sold overseas is at present from 50 per cent. to 60 per cent. of the total grain marketed.

Of the 6-row varieties, the most important is Atlas, which is grown on 80 per cent. of the area sown to this type of barley. Grain from this variety would therefore predominate in shipments from Western Australia.

The major overseas market is the United Kingdom where the grain is used either for malting or as a stock food. For malting, however, the sample must be of excellent quality; for this purpose the crop requires suitable conditions for growth, while considerable care is required in its harvesting.

Suitable conditions for the growing of malting barley, either 2 or 6-row, are the direct opposite to those necessary for the production of high quality wheat. In general, light land in the better rainfall areas, with its slower ripening conditions is required for good quality barley grain.

The product must be a plump grain, bright in colour, starchy in cross- section (hard, steely grain is unsuitable for malting) and free from admixture of other seeds or other foreign matter. In addition the grain must be well ripened and the skin undamaged, with about one-eighth of an inch of awn still left on the grain.

If the sample does not measure up to these requirements it is sold for stock food, usually at a discount.

In recent years trial shipments of 6-row barley have been sent to Asian markets, principally to Japan, where it was pearled and used as a substitute for rice. Unfortunately in the variety Atlas the aleurone layer, which lies underneath the skin, is blue in colour. On pearling, the removal of the skin leaves a bluish grain, which gave rise to considerable prejudice even though, on cooking, most of this colour disappears.

Fig. 3.—Two popular barley varieties. That on the left is Atlas, a six-row variety. On the right is the two-row Prior, the most popular malting barley in Australia.

It is evident, therefore, that to continue to sell barley for use as a substitute for rice, it is necessary to replace Atlas with a variety possessing a white aleurone. One variety which may prove to be suitable is Beecher; this is now under test on wheatbelt Research Stations (2). It was developed from a cross with Atlas and appears to retain the good yielding and malting qualities of Atlas and therefore it should also be suitable for the British malting trade.

Other less popular 6-row varieties are Cape and Club Mariout; of these Cape is capable of producing grain of malting quality, but it is usually outyielded by Atlas. Club Mariout, however produces grain of poor malting qualities. It is therefore most desirable that grain from this variety be excluded from shipments of barley to the United Kingdom so that it will not lower the malting value of such cargoes. For this purpose Club Mariout should be discarded in favour of a better variety, such as Atlas. The variety Californian, with qualities similar in many respects to those of Atlas, is also grown on a small acreage.

For the overseas market the most suitable 6-row variety is Atlas. As already noted its blue aleurone makes it unwanted in some markets and it is, therefore, desirable to replace it as soon as possible with a variety without this particular feature.

(1) Reeves, J. T.; "Oats and Barley Varieties in Western Australia" Jour. Agric., W.A. 111, No. 4, 3rd Series, p. 453-461.

(2) Shier, F. L. and Reeves, J.: "Cereal Variety Trials" Jour. Agric., W.A. IV. No. 2, 3rd Series, p. 212.

LUCERNE IN THE NORTH-WEST

An interesting feature of a field day held at the Gascoyne Research Station, Carnarvon, this year was the interest shown in lucerne growing under irrigation.

Speaking at the field day and later at a show of colour slides at the Gascoyne Hotel, the Agrostologist attached to the North-West Branch of the Department of Agriculture (Dr. B. Rumich) said that lucerne growing was destined to play an important role in irrigated agriculture in the North-West.

Irrigated lucerne patches gave large quantities of excellent fodder which, in the form of baled hay, was readily saleable in the district.

Whereas Carnarvon's principal crop, the banana, was highly susceptible to saline conditions, requiring water with less than 40 grains of salt to the gallon, lucerne could be grown successfully even with water containing almost 200 grains to the gallon.

There was usually a rise in the salt content of the irrigation water during dry spells and on many properties where banana-growing was a somewhat risky proposition lucerne could be a profitable alternative crop.

Apart from the cash value of the lucerne, it was valuable as a soil improver and could be featured as a rotational crop which would increase the humus content of the soil and improve its texture and water-holding properties.

On the property of Messrs. H. Smeed and G. Harris near Carnarvon dairy cattle were being strip-grazed on a 3-acre lucerne paddock by means of an electric fence. The lucerne was two years old and was being irrigated with water carrying 170 grains of salt to the gallon, On this property the area under lucerne was being extended.

Dr. Rumich showed a number of coloured slides of station properties where lucerne was being grown successfully.

At the Gascoyne Research Station irrigation trails were being conducted to determine the best types of sprinklers to use and the most economical quantities of water to apply.

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Fig. 1.—A crop of early-flowering chrysanthemums showing method of growing in wide beds, and the system of watering from overhead oscillating spray lines. The variety here is Sweetheart, which commences flowering at the end of July

Commercial Chrysanthemum Growing

A Description of Overseas Methods

By J. CRIPPS, B.Sc. (Hort.), Horticultural Adviser

THE chrysanthemum is England's most important commercial flower crop and is extensively produced in Europe and the United States. Climatic conditions in these areas are rather different from those in Western Australia, but a description of English and American practices may be of interest to local growers and could bring to light useful information. Furthermore recent research has led to the introduction of new ideas and fundamental information on the physiology of the chrysanthemum plant is being accumulated.

Every chrysanthemum grower the world over is well aware that only skilful cultivation gives profitable crops of this flower. In England great care is taken in the selection of stocks for propagation, especially since the discovery of a virus which causes distortion of the flowers, but the old idea that stem cuttings are inferior to basal cuttings has been discarded. On the other hand the new hormones introduced to speed the rooting of cuttings have not become popular since they do not appear to be necessary for this plant. Having rooted his cuttings, the English grower pots them

into three-inch pots or soil blocks but from here methods vary according to the variety grown and its season of flowering.

OUTDOOR CULTIVATION

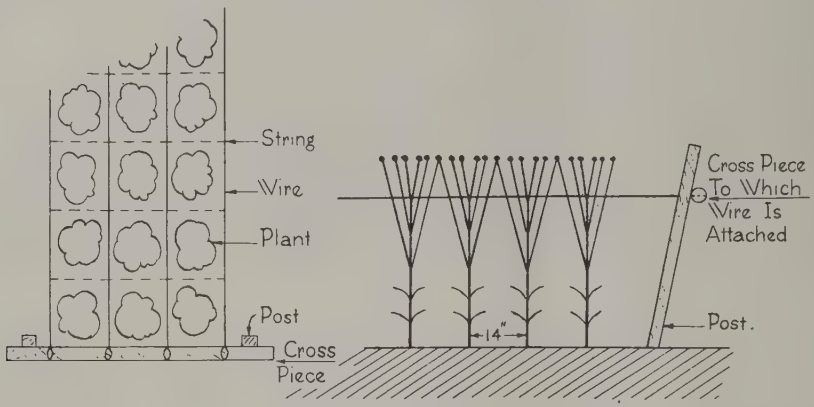
Early varieties which flower from mid-July to mid-September are planted out of doors, but the season may be extended by one month by growing later-flowering varieties and protecting the plants against frost and inclement weather with hessian stretched on wood and wire frameworks.

The preparation of the land consists of deep ploughing and the incorporation of up to 50 tons to the acre of dung and a variable quantity of lime, but no artificial fertilisers are considered necessary since English soils are not normally deficient in phosphate as are many areas here. The quantity of lime applied varies according to the soil which should ideally be neutral (pH7) for this crop.

Planting commences early in May and the young plants are set out in beds or strips consisting of three rows 14in. apart, the plants being a similar distance apart in the rows. A path 2ft. 8in. wide is allowed between the beds.

Stakes are driven in at each corner of every bed and a cross-piece attached between those at the end of the bed. Wire is then stretched along the bed on the outside and between the rows, and string is attached to the wires and across the bed forming squares through which the plants grow and by which they are supported. The squares are raised by sliding up the crosspiece as the plants grow. Recently pig-wire has been utilised instead of wire and strings, since it consists of ready-made squares, and thus reduces labour costs.

Top-dressings of fertilisers may be applied during the growth of the plants, and watering is by means of oscillating spray lines, i.e. pipes with nozzles every 15in. which rotate through an angle of 90° and give a more even distribution of water than sprinklers. The plants are stopped once at about 15in. high and the resulting side shoots disbudded, eventually producing six to eight flowers each.



The introduction of parathion has aided pest control, for it kills all pests including the chrysanthemum nematode and leaf miner. Malathion may prove a less poisonous substitute.

GLASSHOUSE GROWING

Cultivation under glass is of less interest to Western Australian growers but 800 acres of chrysanthemums are grown under glass in England, and if a complete picture is to be presented this type of production must receive a mention. Glasshouse-grown flowers are in the shops from October to mid-January, that is throughout autumn and early winter, thus completing a six month season. The chrysanthemum crop usually follows tomatoes under glass and the plants may be grown in 10in. pots until moved into the glasshouse. This

Fig. 2.—A late crop of outdoor chrysanthemums in England, showing method of supporting plants by wires and strings, also the hessian protection against frost, wind and rain

(Figs. 1 and 2 are published by courtesy of Mr. John B. Stevenson, a chrysanthemum grower of Hillingdon, Middlesex, England)

method is expensive, but generally produces the best quality blooms. They may also be grown in beds in the open and transplanted, but this system is rapidly becoming less popular due to the poor quality blooms resulting.

A recently-introduced piece of equipment, the mobile glasshouse, has obviated the need for transplanting, for the crop can be grown in beds and the glasshouse moved over it when autumn frosts threaten.

Watering of plants under glass is usually carried out by means of a hose, but trickle irrigation, an old idea at last perfected, is replacing the hose and thus reducing both the monotony of glasshouse work, and the wages bill. This method of watering, which utilises a series of small-diameter hoses fitted with drip-feed nozzles at frequent intervals, has encouraged liquid feeding, always the best and most natural way of supplying nutrients, and has incidently further lessened labour costs.

The two most important developments overseas, however, are the use of late-struck cuttings and artificial illumination to delay flower bud formation. The use of late-struck cuttings shortens the growing period, thus reducing the number of weeks during which attention has to be given to the crop, also the purchase of 10in pots becomes unnecessary and production costs are therefore reduced on two counts.

LATE-STRUCK CUTTINGS

Two systems are in use. In the first the original growths from the stools are pinched back and the ensuing shoots produced provide the propagating material. In the second method a small number of

Fig. 3.—Chrysanthemums packed for market, showing method used in England. They are packed in returnable wooden boxes with the individual blooms supported by cushions and held in position by a dowel fixed across the centre of the box

(Photo by courtesy of the Controller of Her Majesty's Stationery Office)

cuttings are taken at the normal time (February), struck, planted out 6in. apart in April, stopped the following month and the resulting side-shoots used as cuttings. Cuttings struck in early June, planted mid-August 9in. apart each way under glass are stopped when established and only allowed to produce three flowers in December. Cuttings struck even later, i.e. in July, planted 6in. apart are not stopped and therefore produce only one flower, also in December. This one-flower, one-plant method of growing chrysanthemums is very popular in North America—so popular in fact that it is becoming almost standard practice.

Plants originating from late-struck cuttings are normally grown more rapidly and the flowers are formed at a reduced height as compared with those on plants grown in pots. Suitable English varieties for propagation by means of late-struck cuttings are Balcombe Perfection, Shirley Late Red, Favourite, Friendly Rival, Agnes Ford and American Beauty.

DELAYED FLOWER FORMATION

Artificial illumination to delay the flowering of chrysanthemums was first introduced in North America where photoperiodism, or day length necessary for

flower formation, has been studied extensively, but before it is described briefly a few words of explanation may be helpful. The flowering of the majority of plants is controlled by temperature or day length or a combination of both. For instance, a particular plant may initiate flower buds when the temperature rises above a certain point, that is, when the weather becomes warm in spring or when the number of hours of daylight exceeds the minimum required for flower production, that is when the days lengthen or shorten, as the case may be.

In the case of the chrysanthemum, day length, is the dominant factor and late chrysanthemums initiate flower buds when the day length decreases to 14½ hours from the summer maximum of 16 experienced in Europe and North America, or to be more correct, when they are subjected to more than 9½ hours of darkness, provided that the temperature is at or above 60° F. Flower formation, a separate process takes place at the same temperature when the hours of darkness are further increased to 10½. Experiments revealed that almost total darkness is needed to produce these effects and that a comparatively low intensity illumination is all that is necessary to delay flower formation artificially.

Ordinary 40-watt electric light bulbs attached to a cable at 4ft. intervals and suspended 2ft. 6in above the apex of the plants and switched on automatically for two hours half way through the night, effectively break the period of darkness; the chrysanthemums being deluded into thinking that they have experienced two short nights and that summer is still present.

The process is not too expensive for commercial use, costing about threepence per plant, including cost of electricity and depreciation of equipment. Providing the temperature does not fall below 60° F. both during, and for one month after, the treatment, flowering is delayed for three weeks and could probably be delayed longer but at greater cost.

Using glasshouses and this method of controlling flowering, chrysanthemum blooms are produced from the end of July to the end of January in England (equivalent to January to July here) and all the year round in America.

If this method of delaying flowering were to be used here to produce late chrysanthemums they could be protected from the winter frosts, gales and rain by means of hessian stretched on a wood and wire framework.

Few if any experiments have been conducted with chrysanthemums in Western Australia and in the absence of experience under our conditions no concise recommendations can be given. Growers would be well advised to apply any new treatments to a small number of plants only and to extend their use if they are found to be successful.

WILD DOGS PLENTIFUL.

Vermin inspectors report large-scale migrations of dogs into the settled areas, and a noteworthy feature of the invasion has been the increased sizes of litters. The average is usually about five pups to a litter, but three litters destroyed recently contained eight pups, and litters of nine and ten have been reported.

Large litters have been reported from the Kimberleys, the North-West, the Eastern Goldfields and the Nullarbor Plains. Pastoralists have become increasingly active in destroying dogs, and co-operative groups for this purpose have been formed north of Meekatharra, at Port Hedland and in the Upper Gascoyne areas. The destruction of 125 wild dogs by Agricultural Protection Board doggers operating to the south and west of Lake Barlee was a surprise to local Vermin Boards.

Other doggers operating in the agricultural areas distributed over 223,000 baits and obtained 178 of the 359 wild dogs destroyed there. They obtained 15 scalps in these areas during August.

An extensive aerial baiting campaign against wild dogs will be conducted from October 19 to November 8 during which 695,000 baits will be dropped in flights totalling almost 11,000 miles. Baits willl be dropped over a large area including Wiluna, Meekatharra, Mt. Vernon, Wittenoom, Abydos, Nullagine, Wiluna, Laverton and Southern Cross.

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On the left of the photograph, are plants from approved seed. Note that they have intermingled between the rows and that the foliage appears soft and healthy. The smaller bushy plants on the right are from unapproved seed. The leaves on these plants are hard and unhealthy looking.

BETTER POTATO YIELDS

IT PAYS TO USE APPROVED SEED

RECENT demonstration experiments carried out by the Department of Agriculture Vegetable Branch at the Tobacco Research Station, Manjimup, have shown that a 55 per cent. greater yield of first grade potatoes can result from planting approved seed potatoes as against unapproved seed.

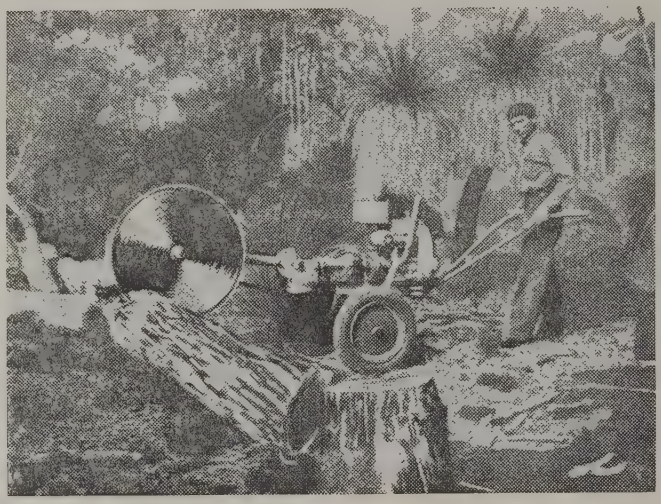
The Department of Agriculture operates an "approved" seed potato scheme which ensures, as far as possible, that seed offered for sale has been obtained from areas of crops which have been inspected during the growing season by an officer of the Department of Agriculture. Only those crops which are of a high standard and virtually free from virus diseases (less than 2 per cent. infection prior to roguing) are approved for seed purposes.

To demonstrate the part that clean seed can play in the productiveness of a crop, an area on the Manjimup Tobacco Research Station was planted with two lines of seed—one from an approved crop, the other from an unapproved crop in which Leaf Roll virus disease was evident. Both types of seed were planted in rows alongside each other under identical soil conditions and with the same application of fertiliser.

Germination of the approved seed was even, practically all plants emerging from the ground at the same time. The unapproved seed, however, gave a somewhat uneven germination, although a full stand was obtained.

On approaching maturity, the plants from approved seed had grown vigorously and they had intermingled between the rows. The foliage was soft and healthy, whereas the plants from unapproved seed were small and bushy, the leaves being hard and of a yellowish-green appearance.

When harvested, the approved seed gave a 25 per cent. higher total yield than the unapproved, while the yield of first grade tubers from the approved seed was 55 per cent. higher than from the unapproved seed.



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POTASH FOR PASTURES

By T. C. DUNNE, B.Sc. (Agric.), Ph.D. (Calif.), Chief Plant Nutrition and Research Officer

INSOFAR as potassium is concerned, dairying in the South-West part of the State is a rather exhaustive type of farming. In the main, this is due to the necessity for cutting hay and removing it from the paddocks on which it was grown. The potassium in a two-ton crop of clover hay is at least equal to that in 90 lb. of potash fertiliser and often it is much more.

It is usually the sandy-surfaced soils with little or no clay near the surface which first become potassium deficient. In a number of cases, they have become so depleted of potassium that subterranean clover has completely disappeared from the pastures.

In our earlier experiments on some of these soils we used low rates of potash in the interests of economy—but it proved to be false economy. Last year we arranged for areas to be cultivated and reseeded with subterranean clover and included heavier rates of potash in the experiments.

The answer was definite—on sandy-surfaced soils where potassium has become so low that only silver grass remains, vigorous subterranean clover can be obtained only by reseeding and applying muriate of potash at the rate of about 2 cwt. per acre.

This is a lot of fertiliser—it costs about £3 10s. per acre. Nevertheless, the farmers on whose properties experiments were conducted are satisfied it is profitable and so are we. Let us take the results from Mr. Reading's property at Vasse.

The no-potash plots cut 23 cwt. of pasture (dry weight) but it was all grass—no clover even though the plots had been reseeded. The 2 cwt. of potash plots cut 43 cwt. which contained no less than 26 cwt. of clover; that is, 60 per cent. of the total cut was subterranean clover. We also checked up on the protein contents of the pasture. The no-potash plot grew 2.2 cwt. of protein per acre while the 2 cwt. of potash plot grew 7.1 cwt. of protein—a difference per acre of 4.9 cwt. of protein. Now this difference of 4.9 cwt. of protein is equivalent to the protein in 35 cwt. of bran. To repeat—for the cost of reseeding and applying 2 cwt. of potash there was an increase in the amount of protein produced equivalent to that in 35 cwt. of bran.

Another striking feature of these plots was that in December when the rest of the paddock was covered with dry mature grass, the plots which received 2 cwt. per acre of potash were covered with lush green subterranean clover which was still growing vigorously.

What of the future on these reseeded areas? If the area is cut for hay—and it

is a great temptation to do so—I think at least 1 cwt. of potash fertiliser should be applied the next year. If it is used for grazing, it should receive a lower maintenance dressing of potash every year just as superphosphate is used. In order to provide for potash maintenance, a superphosphate-potash mixture containing five parts of superphosphate to one part of muriate of potash is now being made up by the fertiliser manufacturers. If this mixture is applied at the rate of one bag per acre it will provide 31 lb. of muriate of potash per acre.

This super-potash mixture is also recommended for a number of other areas including some of the grey, loamy soils where potash deficiency is not yet as severe as on the sandy-surfaced types but where there is ample evidence of potassium depletion. On these areas, subterranean clover has persisted but it does not make the expected amount of growth in the spring. Instead, the edges of the clover leaves scorch and the pasture dies off as though it is affected by drought. These are the symptoms of potassium deficiency and where they occur the super-potash mixture should be used. It should increase production and prevent total decline of the clover. I am sure it is worth a trial.

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GETTING MORE FROM OUR PASTURES

By N. DAVENPORT, Senior Adviser, Meat Production

DURING the last twenty years or so, the productivity of our pastures in the sheep-grazing areas has been increased enormously by the establishment of subterranean clover, together with the liberal use of superphosphate. This blessing has brought new problems in its train, as blessings usually do, and one of these problems is how to manage the improved pastures to the best advantage.

I should like to discuss one aspect of the management of these improved pastures, and that is their use as dry paddock feed over the summer period.

The pattern of growth of our pastures is typical of the winter rainfall and dry summer type of climate. The volume of herbage gradually increases until the spring period, when the growth is at a very rapid rate indeed, and is far greater than stock can cope with. It is this excess spring growth which provides most of the paddock feed over the summer months. Apart from the little that is cut as pasture hay, this excess growth is left to mature and dry off naturally.

As pasture passes from hay to the mature dry state there is a considerable reduction in quality, or in other words it has a lower carrying capacity per acre.

The question which naturally arises then, is whether anything can be done to reduce this loss of feeding value from those pastures which are allowed to mature and dry off naturally, and so use them to better advantage?

The obvious solution, is to cut it all and conserve it as hay, which is, of course, impracticable. However some benefit can be gained by mowing the pasture and letting it lie where cut, or by going to the slightly greater expense of raking it into windrows. In this way, more food per acre is available to the stock than by letting it mature and dry off naturally. Some farmers are doing this.

In order to get some idea of the benefit to be obtained from such a practice, a trial was conducted at the Avondale Research Station. A block of 20 acres of pasture was selected and divided into two areas of 10 acres each of equal feeding value.

The pasture consisted of Wimmera ryegrass and subterranean clover with a small proportion of the usual species, such as capeweed, barley grass and wild geranium. It contained less than 50 per cent. subterranean clover and was a good average pasture.

One 10-acre portion was mown at the hay stage and raked into windrows and the other 10 acres were left to mature naturally. The mown area yielded at the rate of 24 cwt. of pasture hay per acre.

Each area was stocked with 40 dry full-mouthed cross-bred ewes commencing on 2nd December. They remained there until the 21st May, i.e. for 24 weeks. This was therefore a carrying capacity of 4 sheep per acre over the summer and autumn period.

These dry ewes were weighed at the commencement and then every fortnight. They were fat to start with, averaging 170 lb.

The results were very informative. The ewes in the mown area increased several pounds in the first six weeks, and then fell very gradually, ending up after 24 weeks, in good condition and 9 lb. lighter. After 18 weeks, i.e. a little over four months, they still weighed the same as when they started.

On the other hand, the group in the unmown area held their weight for a fortnight and then fell steadily, ending up 28 lb. lighter and in good store order.

After the trial, both lots were joined and from then until shearing had the same feed conditions. The wool from the group on the mown area averaged slightly over half a pound per sheep more than the other group.

Another benefit to be seen from cutting the pasture was the even cleaning up of the mown area, whereas on the other grazing was uneven, with patches of long grass left which was of very poor feed value.

This trial has been carried out for one summer only but the results show that a greater feeding value per acre is obtainable from mowing as is indicated by the heavier weights of the sheep and the greater wool return. This can be interpreted I think as indicating that the small expense involved in cutting and raking could result in a payable return through increased carrying capacity.

This trial at the Avondale Research Station will be repeated during the coming summer.

ARGENTINE ANTS

The chairman of the Argentine Ant Control Committee (Mr. G. K. Baron Hay), stated that the current season's Argentine ant campaign had now commenced.

The local authorities involved would include Mosman Park Road Board, Cottesloe Council, Claremont Council, Nedlands Road Board, Subiaco City Council, Perth City Council, Perth Road Board, Bayswater Road Board, Bassendean Road Board and Albany Council.

In conformity with last year's scheme, it was planned to treat outlying and isolated infestations first and then to work on a face into the more densely infested areas.

Regulations have been gazetted under the Argentine Ant Act placing certain responsibilities on householders to assist in the general campaign. Householders are required to notify the Department of Agriculture if they suspect that their premises are infested with Argentine ants, as such action will help in obtaining accurate information on the complete distribution of the ant.

The spread of the ant on such commodities as pot plants, firewood and stable manure is prohibited under the Regulations, and a permit must be obtained from the Department of Agriculture before such materials can be removed from an area known to be infested with Argentine ants.

Mr. Baron Hay stated that much of the success achieved in treating over 7,000 acres of ant infested country last year was due to the ready co-operation of local authorities and the general public. He was confident that, with similar co-operation this season, an even larger area could be treated during the coming summer.

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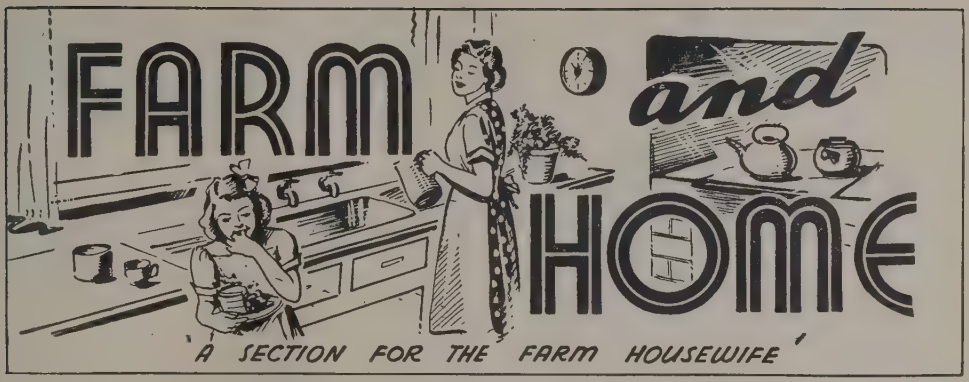
Arrangements have been made for the compilation of a comprehensive index to be incorporated in the December issue—a feature which will greatly enhance the value of the Journal as a work of reference.



GIVE YOUR SEAMS *the* PROFESSIONAL TOUCH

By BRENDA CLEEVE

BADLY-MADE seams label a garment "home-made" more readily than any other feature. The making of seams must be of primary consideration during the construction of a garment—from the cutting out process to the final pressing. The finished result will be well worth any extra time and care taken in the making.

Good seams start with good cutting. Place your pattern carefully, and use sufficient pins to hold it securely. Keep the material as flat as possible on the table while cutting. Cut with the blunt end of the scissors on top so that the narrower pointed blade slides along under the material. For a smooth line avoid cutting to the end of the blades each time. Instead, when nearing the end of the blades, slide the scissors along for the next cut.

After cutting, pin the seams ready for tacking. Unless you are a very experienced needlewoman it is wiser to tack all seams for a more satisfactory finish. To pin material into position for seaming it should be left flat on the table, especially with long seams as on skirts. This will give a smoother line as the material is not likely to be stretched, as often occurs when it is placed over the fingers. Pins should always be placed at right angles to the seam line. This prevents a bumpy seam, makes tacking easier and the pins can be removed more readily when tacking or machining. (See Fig. 1.)

As with pinning, tacking should be done with the work flat on the table. Use a long needle to enable you to tack more quickly.

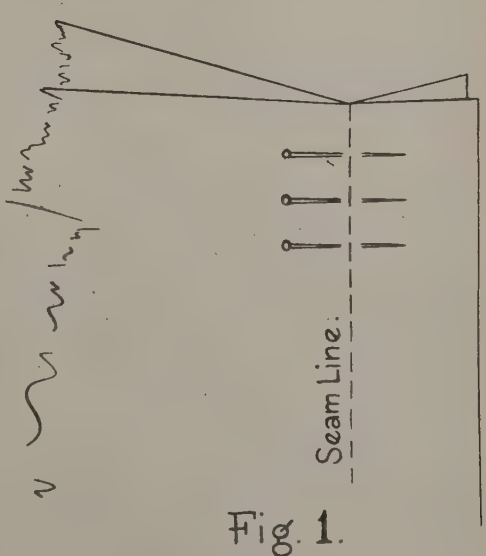


Fig. 1.

TACKING BOARD

A handy piece of dressmaking equipment is a piece of board approximately 12in. x 20in. Masonite or even thick cardboard could be used, or it can be made of

smooth plywood. It is ideal for use when tacking or pinning. The board is useful to place over a polished or painted table to prevent pin and needle pricks, and it gives a firm surface if held on your lap.

When tacking or machining, work from the top down or the centre outwards, i.e., from the waist to the hem or the neck to the armhole. This gives a better hang to the seams.

MACHINING

Before machining a fabric which has not been handled before, check the tension of your machine, using a scrap of the material doubled. It is useless to test the tension on a single layer of material as the only time this is used in dressmaking is when gathering. At any other time two or more pieces are being sewn together.

Thick materials need a larger needle, thicker thread and longer stitch than fine materials. Very fine materials such as nylon may require a looser tension.

To avoid the cottons becoming entangled, in the machine stitching, place both threads on the machine to the back with the top one under the presser foot. When the seam is complete, remove the tacking a few inches at a time to avoid splitting or tearing, especially on fine materials and rayons.

CHOOSING A SEAM

The seam to be used on a garment will depend on the style whether the seams are to be ornamental or purely constructional; whether they are curved or straight, whether the garment will have to withstand frequent washings. Of course the material being used is most important —whether it is thick, fine, transparent or frays easily.

Simple or Plain Seam.

The simple, plain or open seam is the most widely used of all. It is flat and inconspicuous, consisting of one row of machining on the wrong side. Probably its chief advantage is that it can be taken in or let out as required with a minimum of effort.

After machining, the edges of this seam are usually pressed open, except where the material is transparent when a less conspicuous seam can be made by pressing both turnings the same way.

Where the material is very firm and does not fray, or on coat seams which are to be covered by lining, the edges may be left raw. Otherwise the edges may be finished by more durable methods such as:—

Notching or Pinking.

Here again this should only be done on very firm materials which are not to be washed frequently such as woollens and perhaps on evening dresses which have a limited life.

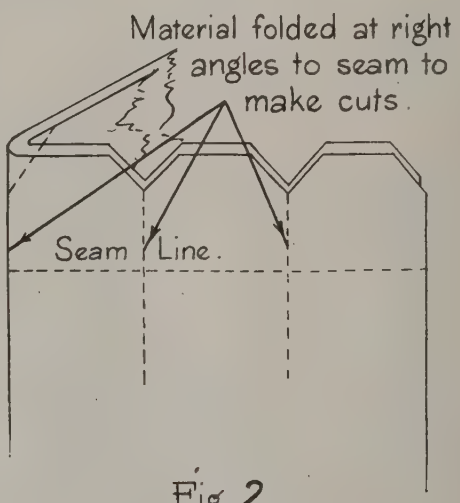


Fig. 2.

If pinking shears are not available the edge may be notched by hand. With a little practice on a scrap of material this can be mastered and done quite quickly. To notch an edge fold one side at right angles to the seam line. With a small pair of scissors cut diagonally across the fold about ⅛in. from the edge to form a V-shaped cut when the edge is opened out again. The next fold should be about ¼in. from the first so that the V-cuts are continuous and resemble pinking. (See Fig. 2.)

Avoid making the cuts too deep as this weakens the seam.

Edge Stitching.

This is the firmest finish for raw edges on the plain seam and is the best one to to use on materials which are to with-

stand constant laundering. It is not suitable on curved edges or on very heavy materials as this results in a bulky seam. Turn under the raw edges once to the wrong side and machine stitch close to

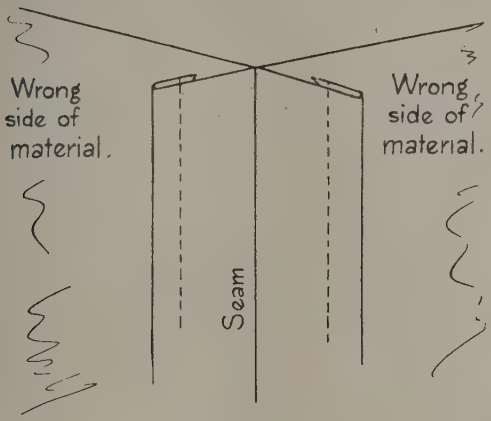


Fig. 3.

the folded edge. If stitched close to the raw edges after one or two washings the material will have frayed out again and the value of the firm finish lost. Remember when machining that the edges are merely machined on the inside for neatening and should not be sewn to the body of the garment. (See Fig. 3.)

Overcasting.

Overcasting is the finish most suitable for heavy weight fabrics, curved seams or those on the bias or cross grain as these are easily stretched. It is also useful on fine materials where pinking or edge stitching would be too conspicuous. Overcasting worked in a matching thread is the least visible finish. The edges may be overcast singly or together—singly with seam pressed open in a bulky fabric; together on fine materials or when used at waistlines or armholes. The stitches should be approximately $\frac{1}{8}$in. deep and $\frac{1}{8}$in. apart. When overcasting avoid pulling the cotton too tightly as this folds the edge over making unnecessary bulk and causing the seam to pucker.

Binding.

This is suitable on thick materials and on unlined garments such as coats and dressing gowns. A soft commercial bias binding or any soft material such as lining fabric, voile or net may be used. Be careful when attaching the binding not to stretch it and cause puckering on the seams.

Welted Seam.

A welted seam is a variation of a plain seam and is used as a trimming especially on winter garments or plain fabrics such as linens. (See Fig. 4.)

Machine the seam as for a plain seam but press both edges to the same side. If the material is bulky the underneath edge may be trimmed back so that it is $\frac{1}{2}$in. narrower than the top. This is usually necessary on thick fabrics to avoid a ridge showing on the right side.

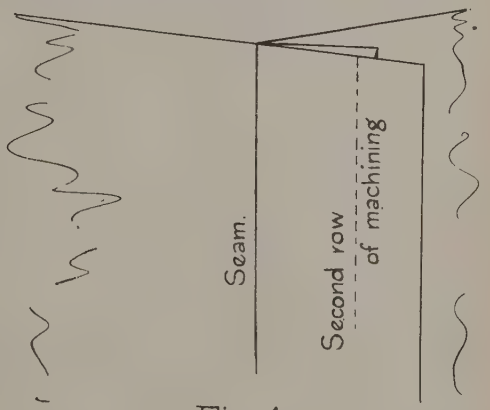


Fig. 4.

Now do another row of machining through the three layers of material the desired width from the first row to form an effective trimming. The second row is best worked from the right side but the free edge must be held firmly on the wrong side first. If the raw edges on the wrong side fray badly as they may on a linen, they can be overcast.

French Seam.

Here is a firm seam but one only suitable for fine materials. It cannot be used on curved seams and having no allowance for letting out is not a good seam to use on fitted garments. To make this seam, place the wrong sides of the material together as the first row of machining is done on the right side. This should be

done ¼in. outside the seam or fitting line. Trim the turnings back to ⅛in. after machining. Now press the seam so that it is flat on the wrong side. Turn the seam to the wrong side and fold so that your first row of machining is right on the edge of the fold. Work another machined row on the seam line, i.e. ¼in. from the folded edge. This row must be so placed that all the raw edges are completely enclosed. French seam should be no wider than ¼in. If a "fringe" is visible on the right side the turnings have not been trimmed back far enough before working the second line of machining.

Flat Seam.

Like the French seam this is not suitable for use where any alterations may be necessary. It is a very firm seam and if worked properly is the flattest of all seams. For this reason it is particularly useful on underclothing, shirts, blouses, pyjamas and babies' clothing.

Where the garment is to be a fitted one such as a blouse, make a plain seam on the right side of the material, taking up all the seam allowance. Now trim one edge back to ¼in. from the machining row and the other back to ½in.—this may be a little wider on a thicker material such as flannelette. Now press both turnings so that the wider one covers the narrower one. The seam must be quite flat on both sides with no pleat on the wrong side.

Turn the edge of the wider piece under and machine it down on the edge of the fold so that the narrow piece is completely concealed.

An easier method if making this seam can be used where the fit is not so important as with pyjamas. Turn down a single fold about ¼in. wide on to the wrong side of one edge. Slip the edge of the second piece right to the crease of this fold and tack firmly. Wrong sides should be together. Now machine ¼in. from the edge of the fold so that the two pieces of material being joined are caught firmly together. It is not important to catch the raw edge of the turning on the first piece—this is merely done to make the second stage simpler. The seam should be pressed so that the raw edges are covered by the piece which was folded in the beginning. Make sure the seam is flat on both right and wrong sides. Finish the seam by working a second machining row on the edge of the fold. The advantage in this method is in the fact that the edge has already been turned in when the seam is pressed flat and if the first machining row is done carefully it is much easier to obtain a good result.

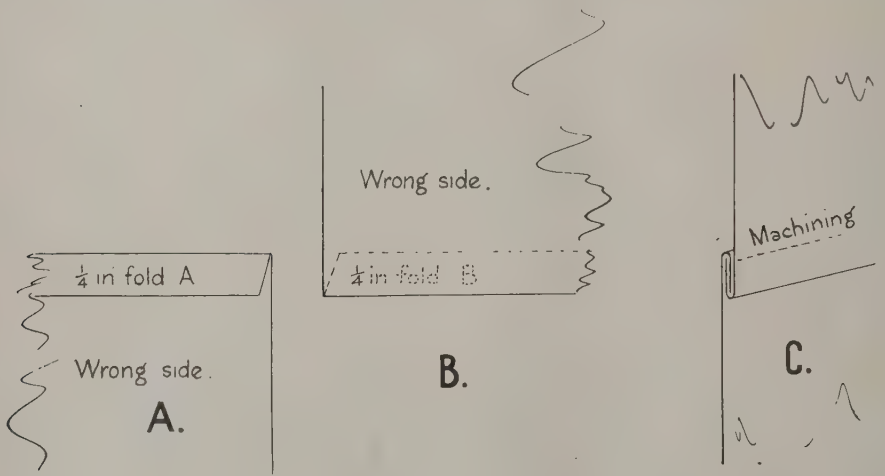


Fig.5.

A flat seam may be worked with the machining rows on the right or wrong sides, although the seam is smoother on the skin if worked on the right side. Where the seam is worked on the wrong side the second machining row may be replaced by hemming for a softer, less visible finish.

Lapped Seam.

This is a seam with many uses—joining yokes, at waistlines as a decorative and for renovations.

For a narrow lapped seam—the usual one for yokes and joining waistlines, turn under the entire seam allowance as one piece. The flattest piece or in the case of a waist join the one with the least bulk in the form of darts and tucks should be the one turned down. Place the edge of this fold exactly on the seam line of the other section, easing or adjusting any fullness as necessary. Edge stitch this close to the fold. For a decorative and firmer finish a second row of machining may be worked a little above the first one. This is a good idea if gathering is to be held in place. Raw edges on the wrong side should be overcast.

A wide lapped seam is worked in the same way except that the first row of machining is worked ¼in. or more from the edge to give the appearance of a tuck and the second row is omitted.

Where a decorative finish is desired, lace, braid or bias strips can be placed under the turned edge before it is placed on to the second piece and sewn in with the first machining row. To outline seams with contrasting colours or fabrics a double lapped seam can be used. Turn down a fold on both pieces the width of the seam allowance. Place these edges over the material to be inserted leaving the desired amount of insertion showing. Machine along both edges.

Where the amount to be inserted is over ¼in. wide more turning will need to be taken if the garment is a fitted one as the insertions will alter the size of the pattern.

A double lapped seam can be an effective way of adding extra width or length into a garment, especially on children's clothing. Cut the garment where the extra allowance is to be made and turn a single fold on each side of the cut. Place each edge over the material to be inserted and machine as before. Braid or binding can be inserted under the fold before machining to give a more decorative finish. A pretty result can be obtained by inserting a gathered piece between the two edges i.e. a ruched band let in.

This method of renovating is often a more satisfactory way of adding length than letting down a hem, especially where the material has faded.

These seams are the most common ones used and a knowledge of their use and construction can help the amateur dressmaker to produce a better finished article. It is well worth while spending a few minutes in practising the seam until you are proficient and any time spent in tacking is never wasted. Always consider your material first as this, more than any other factor governs the type of seam you will use.

FARMERS

This is YOUR Journal, and it has been written, edited and presented in a sincere endeavour to give you helpful information in an interesting manner.

We would like to have your views on the Journal—to know whether you like it or whether you don't. Drop a line to the editor and tell him the features you like and don't like in this issue—or the features you hope to see in future issues.

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BOOKS... *for FARMERS*

THE following books on agriculture have been added to the stock of the Library Board of Western Australia, and can be borrowed freely from public libraries in the following districts:—York, Preston, Moora, Wongan-Ballidu, Quairading, Augusta-Margaret River, West Arthur, Drakesbrook, Plantagenet, Nyabing-Pingrup, Mingenew, Lake Grace.

GENERAL

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STOCK FOODS

All foods for stock sold in Western Australia are required by the Feeding Stuffs Act, 1928-51, to be registered annually with the Department of Agriculture. For the purposes of the Act "Foods for Stock" include stock licks, which in turn embrace all preparations claimed to supply or primarily intended to supply mineral matter to stock.

The registration year for stock foods commences on 1st July each year. When making application for registration manufacturers must submit a guaranteed analysis for each of their products, together with a list of ingredients used in each stock food. Regular inspection and sampling is carried out by officers of the Department to see that stock foods comply with the registered analysis.

Sellers of stock foods are required by the Feeding Stuffs Act to ensure that to each package is clearly and conspicuously attaced a label or brand showing the name and place of business of the manufacturer or importer, the registered brand and name of the food or lick and the registered analysis.

A list of stock foods and stock licks which have been registered for the current registration year appears hereunder together with a list of results of analyses of official samples taken by Departmental inspectors.

Before purchasing any food or lick buyers are advised to consult the list of registered stock foods and stock licks from which a comparison of foods or licks of similar types can be made and also to ensure that packages are correctly labelled. If any doubts arise inquiries should be made at the Department of Agriculture, where information on the provisions and requirements of the Feeding Stuffs Act and advice on other aspects of stock feeding can be obtained.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride ($NaCl$).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%
A.—Simple Foods.											
1.—*Meat Meals.*											
Whale Meal	155	N.W.W.	Nor'-West Whaling Co., Ltd.	Whale carcass	58·0	8·0	1·0	0·4	13·0	12·0	....
								0·2*	9·0*	8·0*	..
Meat Meal	154	W.A.M.E.	The W.A. Meat Export Works	Meat, bone, and blood	45·0	13·0	2·0	2·0	12·0	11·0	....
								*nil**	7·0*	6·0*	..
Imperial Liver Meal	75	IMPERIAL	W. Angliss & Co. (Aust.) Pty., Ltd.	Animal livers and lungs	65·0	18·0	1·0	....	....	....	....
Meat Meal	5	COOGEE	Anchorage Butchers Pty., Ltd.	Waste meat products	36·0	18·0	2·0	1·0	12·5	12·5	..
								*nil**	9·0*	8·0*	..
Whale Meal	11	AUSTRALIAN WHALING COMMISSION	Australian Whaling Commission	Whale carcass	60·0	10·0	1·0	0·8	10·5	9·5	..
								0·4*	8·5*	7·5*	...
Meat Meal	157	MIDLAND	The Midland Junction Abattoir Board	Animal offal and residues	50·0	18·0	2·0	1·5	6·0	5·5	.
						15·0*		*nil**	4·0*	3·5*	..
2.—*Meat and Bone Meals.*											
Imperial Meat and Bone Meal	74	IMPERIAL	W. Angliss & Co. (Aust.) Pty., Ltd.	Animal meat, bones, and livers	50·0	16·0	2·0	...	....	....	....
Bone and Meat Meal	73	KITCHEN'S	J. Kitchen & Sons Pty., Ltd.	Animal fat and bones	42·5	10·0	2·5	1·5	18·0	15·2	..
								*nil**	13·0*	11·0*	.
Do. do.	72	APEX	E. J. Fry Pty., Ltd.	Meat, bone, and blood	37·0	9·0	1·5	1·0	15·0	15·0	..
								*nil**	5·0*	5·0*	...
Feeding Meat and Bone Meal	54	MERCURY	H. C. Sleigh, Ltd.	Animal meat and bone	45·0	14·0	1·5	0·7	20·0	13·0	.
								0·6*	17·1*	11·3*	..
Protein Meat and Bone Meal	18	CHAMPION	Sims Cooper Freezing Works Pty., Ltd.	Meat works offal	50·0	18·0	5·0	1·0	10·5	8·0	.
								0·2*	8·5*	5·0*	....

Meat and Bone Meal	14	PENNELL'S	C. A. Kirkby & Sons	Meat and bone	50·0	12·0	4·0	1·2 0·5*	14·0 10·0*	14·0 10·0*	
Do. do.	10	TB & S in diamond Albany	Thomas Borthwick & Sons (Australasia), Ltd.	Animal offal	45·0	20·0	4·0	1·0 *nil**	10·0 8·0*	9·0* 6·0*	
Do. do.	158	VITA MEAL	Wright's, Ltd.	Animal waste	42·0	13·0 7·0*	2·0	1·5 0·4*	13·0 5·0*	15·0 *nil**	
3.—Blood Meals.											
4.—Liver Meals.											
5.—Whale Solubles.											
Spray Dried Whale Solubles	12	AUSTRALIAN WHALING COMMISSION	Australian Whaling Commission	Whale carcass	82·0	0·4	0·4	2·0 1·4*	1·4 1·1*	1·3 1·0*	
6.—Fish Meals.											
Cray Meal	4	ANCHO	Anchorage Butchers Pty., Ltd.	Waste crayfish products	36·0	12·0	10·0	3·5 2·5*	7·0 4·0*	14·0 11·0*	
7.—Milk Foods.											
Dried Buttermilk Powder	33	SUNNY WEST	South-West Co-operative Dairy Farmers, Ltd.	Buttermilk	29·0	11·0 2·0*	·5	..	....	....	
Lactokraft	55	LACTOKRAFT	Kraft Foods, Ltd.	Cheese whey	10·0	1·0 0·1*	*nil*	4·2 3·8*	2·4 1·0*	1·5 0·5*	
Krafco	56	KRAFCO	do. do.	do.	10·0	1·0 0·5*	*nil*	4·2 3·8*	2·4 1·0*	1·5 0·5*	
8.—Wheat and Wheaten By-products.											
Wheat Meal	76	"C" MEAL	W. Thomas & Co. (W.A.), Ltd.	Wheat	8·0	....	10·0	....	....	....	
Do.	27	MILLERS	W. H. Milne & Co.	do.	8·0	....	5·0*	..	..	..	
9.—Oats and Oaten By-products.											
Barlin (Dairy Feed)	166	LINTON	Barrow Linton & Co.	Oats	7·5	5·32	21·0	..	....	....	
10.—Oil Seed Meals.											
Meggitt's Linseed Oil Meal	35	M.L.M.	Elder, Smith & Co., Ltd.	Linseed	30·0	3·5*	10·0	.	.		
B.—Compound Foods.											
1.—Cattle Foods.											
Cattle Food	63	EVE-LYN	Tropical Traders & Patersons	Gristed wheat, barley, rye, pollard, salt, limestone, chalk, animal charcoal, molasses, sulphur, sulphate of iron, copper sulphate, and medicinal herbs	5·0	2·0	5·5	13·0 12·0*	4·25* 3·25*	9·5 8·5*	Sulphur 3·6 (max.)
16% Sweetened Dairy Meal	129	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat germ, peanut and coconut meals, brewers grain, rolled wheat, meat meal, bone meal, limestone, salt, bluestone	16·0	5·0	10·0	3·5 2·0*	3·5 2·3*	2·5 2·0*	..
11% Sweetened Dairy Meal	128	do.	do. do. do.	Bran, pollard, oat meal, meat meal, brewers grain, bone meal, limestone, salt, molasses	11·0	5·0	10·0	2·0 2·5*	2·0 1·0*	2·5 2·0*	....
20% Protein Sweet Dairy Food	108	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, grain meals, brewers grain, malt combings, ground rock phosphate, flax pollard, molasses, oyster flour, urea, whale meal, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	20·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. S. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%
16% Protein Sweet Dairy Food	77	do.	do. do. do.	Bran, pollard, grain mashes, brewers grain, malt combings, bone flour and/or ground phosphate, urea, molasses, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt, sulphate	16·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. S. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.
11% Protein Sweet Dairy Food	107	do.	do. do. do.	Bran, pollard, grain meals, brewers grain, malt combings, rock phosphate, flax pollard, molasses, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	11·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. S. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.
16% Protein Sweet Dairy Nuts	78	do.	do. do. do.	Bran, pollard, grain meals, brewers grains, malt combings, bone flour and/or rock phosphate, technical urea, molasses, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	16·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	Manganese 60 p.p.m. S. Iodine 1·2 p.p.m. Cobalt 3 p.p.m.
32% Dairy Cake Concentrate	102	do. ...	do. do. do.	Linseed meal and/or peanut meal, coconut meal, whale meal, technical urea, pollard, bone flour and/or rock phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt	32·0	1·50*	10·0	5·0 2·0*	8·5 3·5*	9·0 4·0*	Manganese 600 p.p.m S. Iodine 10·2 p.p.m.. Cobalt 30 p.p.m.
2.—*Calf Foods.*											
Calf Food	61	EVE-LYN ...	Tropical Traders & Patersons, Ltd.	Gristed wheat, barley, rye, pollard, linseed, salt, sugar, chalk, turmeric, sodium bicarbonate, cream of tartar, foenugreek, ginger, coriander, copper sulphate (trace), bole armenian	8·5	2·0*	3·86	3·5 2·5*	1·25 ·25*	1·0 0·2*	Carbohydrates 66·45 Sulphur 1·75 (max.) Brewers yeast 2
Calf Meal	130	WESFARMERS	Westralian Farmers Co-op., Ltd.	Pollard, buttermilk, linseed meal, dried yeast, wheat meal, wheat germ, meat meal, limestone, bone meal	20·0	5·0 3·0*	3·0	2·0 0·5*	2·5 1·5*	1·5 1·0*	... ...
Calf Food	121	KAF-O-VITE	Goldsbrough Mort & Co., Ltd.	Wheaten and rice pollard, barley meal, meat meal, wheat meal, coconut meal, peanut meal, safflower meal, lucerne meal, calcium carbonate, bone charcoal, and sugar	16·0	7·0 6·0*	8·0	*nil*	2·5*	4·2*	...
Do.	67	HARPER'S "STAR"	Robert Harper & Co., Ltd.	Wheat, oats, rice, barley, linseed, mustard, branning, whiting, salt, peas, and condiments	12·0	2·5*	10·0	2·0 1·0*	2·5 1·0*	1·0 0·25*	... ...
20% Protein Vitamised Antibiotic Calf Food	79	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Linseed meal, milk powder, predigested cereal meals, pollard, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate, micratized vitamins A and D3, procane penicillin	20·0	2·5*	8·0	3·0 0·5*	2·5 0·2*	2·5 0·5*	... ...

Calf Food	114	WESTERN	David Gray & Co., Ltd.	Malt grains, milk powder, yeast, whale solubles, pollard, wheat cereals, trace elements	18·0	6·0*	7·5	1·5 0·5*	1·5 0·5*	1·0 0·15*	....
3.—*Sheep Foods.*											
Sheep Food	64	EVE-LYN	Tropical Traders & Patersons, Ltd.	Gristed wheat, barley, rye, pollard, salt, limestone, chalk, sulphur, animal charcoal, molasses, sulphate of iron, copper sulphate (trace), medicinal herbs	5·0	2·0 1·0*	5·0	13·5 12·5*	4·0 3·5*	9·6 8·6*	Sulphur 2·75 (max.)
Sheep Maintenance Cubes	131	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat meal, wheat germ, peanut meal, salt, meat meal, limestone, cobalt, copper	14·0	6·0 4·5*	6·5	3·5 2·0*	3·5 2·3*	2·5 2·0*	....
Sheep Breeder Cubes	132	do.	do. do. do.	do. do. do. do.	18·0	8·5 7·5*	7·5	3·5 2·0*	4·5 3·5*	2·5 2·0*	....
21% Protein Vitamised Ewe, Lamb, and Breeders Nuts	109	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Peanut meal, linseed meal, bran, pollard, technical urea, bone flour and/or ground phosphate, molasses, oyster flour, sodium chloride, vitamins A and D3	21·0	2·0*	11·5	4·0 2·0*	3·0 1·0*	4·0 2·0*	.. ....
11% Protein Vitamised Maintenance Sheep Nuts	110	do.	do. do. do.	Bran, pollard, grain meals, bone flour and/or rock phosphate, molasses, oyster flour, sodium chloride, vitamins A and D3	11·0	1·0*	15·0	2·0 1·0*	2·0 0·5*	3·5 1·5*	.. ....
Sheep Nuts	113	WESTERN	Hemphill Gray Oil Mills Pty., Ltd.	Malt grains, yeast, linseed, meat meal, whale solubles, molasses, wheat, rye, barley (trace), cobalt, copper, vitamin B	20·0	4·0 3·0*	7·5	1·5 0·5*	1·5 1·0*	2·0 1·0*	... .
4.—*Poultry Foods.*											
Special Laying Mash	30	MAYCO	The Maylands Milling Co. Pty., Ltd.	Bran, pollard, wheat meal, meat meal, bone meal, shellgrit, and salt	17·0	4·0 3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	.. ..
Laying Mash	15	K.B.	C. A. Kirkby & Sons	Wheat, meat meal, bone meal, bran, pollard, oyster flour	18·0	3·5*	7·0	2·0 0·25*	4·0 1·2*	5·0 1·9*	....
Hi-Protein Mash	137	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat, meat meal, whale meal, bone meal, shell dust	20·0	10·0 6·0*	8·0	0·5 0·1*	5·0 4·0*	2·5 1·5*	....
Hi-Protein Pellets	138	RED COMB	do. do. do.	do. do. do. do.	20·0	10·0 6·0*	8·0	0·5 0·1*	5·0 4·0*	2·5 1·5*	.. ..
Hi-Protein Mash A and D3	139	WESFARMERS	do. do. do.	do. do. do. do.	20·0	10·0 6·0*	8·0	0·5 0·1*	5·0 4·0*	2·5 1·5*	.. ....
HiProtein Pellets A and D3	140	RED COMB	do. do. do.	do. do. do. do.	20·0	10·0 6·0*	8·0	0·5 0·1*	5·0 4·0*	2·5 1·5*	. ..
"P" All Mash	133	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal or whale solubles, bone meal, oyster flour	16·0	6·0 4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	.. .
All Mash Pellets	135	RED COMB	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal, bone Meal, oyster flour	16·0	6·0 4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	.... ..
"P" All Mash A and D3	134	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal or whale solubles, bone meal, oyster flour, stabilised vitamins A and D3	16·0	6·0 4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	....
All Mash Pellets A and D3	136	RED COMB	do. do. do.	Bran, pollard, rolled wheat, gristed oats, meat meal, bone meal, oyster flour, stabilised vitamins A and D3	16·0	6·0 4·0*	7·0	1·0 *nil**	3·5 2·3*	2·5 2·0*	.... ..
Fattening Mash	141	WESFARMERS	do. do. do.	Bran, pollard, oat meal, rolled wheat, meat meal	13·0	6·0 4·0*	7·0	1·0 *nil**	1·2 0·7*	1·0 0·5*	.... ..
Fattening Pellets	142	RED COMB	do. do. do.	Bran, pollard, wheat, meat meal, whale meal, bone meal, shell dust	13·0	6·0 4·0*	7·0	1·0 *nil**	1·2 0·7*	1·0 0·5*	... ...

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis. Crude Protein. % (Min.)	Crude Fat. % (Max.)	Crude Fibre. % (Max.)	Sodium Chloride (NaCl). % (Max.)	Phosphoric Acid (P_2O_5). % (Max.)	Calcium (Ca). % (Max.)	Other. %
Fattening Mash	23	MILLERS	W. H. Milne & Co.	Bran, pollard, gristed oats, meat meal, wheat meal, common salt, limestone	13·0	6·0 3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	
Laying Mash No. 1 ..	28	do.	do. do.	Bran, pollard, wheat meal, meat meal, whale meal, bone meal, gristed oats, oyster flour, common salt	16·0	6·0 3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	
Fortified Laying Mash, Vitamins A and D	26	do. ...	do. do.	do. do. do. do.	16·0	6·0 3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	
40% Vitaminised Universal Poultry Concentrate	101	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Whale meal and/or meat meal and/or fish meal, bone meal and/or rock phosphate, oyster flour, manganese sulphate, micratized vitamins A and D3, riboflavin, trace minerals	40·0	9·0	1·5	0·4 0·2*	12·5 8·5*	20·5 18·5*	
20% Protein Laying Mash	84	do.	do. do. do.	Bran, pollard, grain meals, wheat germ, whale meal, dried solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride	20·0	2·5	6·0	1·5 0·5*	7·0 2·0*	3·75 1·0*	
20% Protein Laying Pellets	85	do.	do. do. do.	do. do. do. do.	20·0	2·5	6·0	1·5 0·5*	7·0 2·0*	3·75 1·0*	
20% Protein Vitamised Laying Mash	86	do. ..	do. do. do.	Bran, pollard, grain meals, wheat germ, whale meal, dried solubles, whale solubles, and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride, micratized vitamins A and D3	20·0	2·5	6·0	1·5 0·5*	7·0 2·0*	3·75 1·0*	
20% Protein Vitamised Laying Pellets	87	do. ...	do. do. do.	do. do. do. do.	20·0	2·5	6·0	2·0 0·5*	7·5 2·0*	3·75 1·0*	
16% Protein Vitamised Laying Mash No. 1	82	do. ..	do. do. do.	Bran, pollard, grain meals, wheat germ, whale meal, dried solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride, micratized vitamins A and D3, lucerne meal	16·0	2·5	6·0	2·0 0·5*	3·5 1·0*	3·75 1·0*	
16% Protein Vitamised Laying Pellets No. 1	83	do.	do. do. do.	do. do. do. do.	16·0	2·5	6·0	2·0 0·5*	3·5 0·75*	3·75 1·0*	
16% Protein Laying Mash No. 1	80	do.	do. do. do.	Bran, pollard, grain meals, wheat germ, whale meal, dried solubles, whale solubles and/or meat meal, oyster flour, bone flour and/or ground phosphate, sodium chloride	16·0	2·5	6·0	2·0 0·5*	3·5 1·0*	3·75 1·0*	
16% Protein Laying Pellets No. 1	81	do.	do. do. do.	do. do. do. do.	16·0	2·5	6·0	2·0 0·5*	3·5 0·75*	3·75 1·0*	
Laying Mash	69	APEX	E. J. Fry Pty., Ltd.	Wheat meal, bran, pollard, meat meal, bone meal, oyster flour, whale meal	16·0	3·0	6·0	1·0 0·25*	3·0 1·1*	3·0 2·3*	

H.P. Laying Mash	40	MORLAY	Robert B. Young	Wheat meal, bran, pollard, oyster flour, meat meal, whale meal and/or whale solubles, bone meal or rock phosphate and minerals	20·0	3·0	5·5	2·0 0·25*	3·0 1·0*	4·0 1·5*	
H.P. Laying Mash (Vitamin Fortified)	41	do.	do.	Wheat meal, bran, pollard, oyster flour, meat meal, whale meal and/or whale solubles, bone meal or rock phosphate, minerals, and apac	20·0	3·0	5·5	2·0 0·25*	3·0 1·0*	4·0 1·5*	
D Mash (Fattening)	39	do.	do.	Wheat meal, bran, pollard, meat meal, bone meal, and minerals	11·0	3·5*	5·5	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Laying Mash	37	do.	do.	Wheat meal, bran, pollard, oyster shell flour, meat meal, whale meal and/or whale solubles, bone meal, ground phosphate, minerals	16·0	3·0*	5·5	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Laying Mash (Vitamin Fortified)	36	do.	do.	Wheat meal, bran, pollard, oyster shell flour, meat meal, whale meal and/or whale solubles, bone meal, ground phosphate, minerals, and apac	16·0	3·0*	5·5	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Laying Mash	163	"CHECKER-MIX" EGG-LAYER	Barrow, Linton & Co.	Bran, pollard, wheat meal, barley meal, ground outs, "Checker-Mix" concentrate penned layers	18·2	4·3	4·9	Trace	1·0	Trace	
Fattening Mash	167	DUKKO	do. do.	Bran, pollard, meat meal, wheat meal, bone meal, shellgrit, salt, riboflavin, emulsified fish o l	15·0	3·5	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	
5.—Chick Foods.											
Special Chick Starter	31	MAYCO	Maylands Milling Co. Pty., Ltd.	Bran, pollard, meat meal, wheat meal, bone meal, shellgrit, salt, riboflavin, emulsified fish oil	17·0	4·0 3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	
Growing Mash	32	do.	do. do. do.	do. do. do. do.	15·0	4·0 3·5*	5·0	1·0 0·75*	3·0 2·5*	3·5 3·0*	
Chick Food	53	H. & C.	Haynes & Clements	Wheat, maize, peas, grit	9·0	3·0 1·5*	4·5	....	....	3·0	
"P" Chick Mash A, AB (A and D3)	143	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, cracked wheat, oat meal, meat meal, buttermilk, bone meal, antibiotics, stabilised vitamins A and D3	16·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·3 0·8*	
Chick Pellets A, AB (A and D3)	144	RED COMB	do. do. do.	do. do. do. do.	16·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·3 0·8*	
"P" Chick Mash B (A and D3)	145	WESFARMERS	do. do. do.	Bran, pollard, rolled wheat, oat meal, meat meal, buttermilk, bone meal, stabilized vitamins A and D3	15·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·3 0·8*	
Chick Pellets B (A and D3)	146	RED COMB	do. do. do.	do. do. do. do.	15·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·3 0·8*	
"P" Grower Mash (A and D3)	147	WESFARMERS	do. do. do.	do. do. do. do.	14·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·5 1·0*	
Growers' Pellets (A and D3)	148	RED COMB	do. do. do.	Bran, pollard, rolled wheat oat meal, meat meal, bone meal, stabilised vitamins A and D3	14·0	5·0 3·0*	7·0	1·0 *nil**	2·3 1·2*	1·5 1·0*	
Chick Starter	24	MULLERS	W. H. Milne & Co.	Bran, pollard, wheat meal, meat meal, ribon, bone meal, salt, gristed oats, vitamins A and D3	16·0	6·0 3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	
Chick Builder	25	do.	do. do.	Bran, pollard, wheat meal, bone meal, meat meal, gristed oats, salt, vitamins A and D3	15·0	6·0 3·0*	6·0	1·5 0·75*	3·0 1·0*	3·5 1·0*	

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.						
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%
18% Protein Antibiotic Vitamised Chick Starter	88	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, cereal meal, wheat germ, meat meal and/or whale meal, whale solubles, lucerne pollard, pea meal, bone flour, and/or micratized vitamins A and D3, ground phosphate, oyster flour, riboflavin, procain penicillin	18·0	2·5*	6·0	1·5 0·25*	3·0 1·0*	2·5 1·0*	....
18% Protein Antibiotic Vitamised Chick Granules	89	do.	do. do. do.	Bran, pollard, cereal meals, wheat germ, meat meal and/or whale meal, whale solubles and/or dried solubles, lucerne pollard, pea meal, bone flour and/or ground phosphate, oyster flour, riboflavin, procain penicillin, micratized vitamins A and D3	18·0	2·5*	6·0	1·5 0·15*	3·0 1·0*	2·5 1·5*	....
15% Protein Vitamised Chick Grower	90	do.	do. do. do.	Bran, pollard, grain meals, wheat germ, meat meal and/or whale meal, whale solubles and/or dried solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, micratized vitamins A and D3, riboflavin	15·0	2·5*	6·0	1·25 0·5*	3·5 1·0*	3·75 0·5*	....
15% Protein Vitamised Growers' Pellets	91	do.	do. do. do.	Bran, pollard, grain meals, wheat germ, meat meal and/or whale meal, whale solubles and/or dried solubles, bone flour and/or ground phosphate, oyster flour, micratized vitamins A and D3, riboflavin	15·0	2·5*	6·0	1·25 0·5*	3·5 1·0*	3·75 0·5*	
Chicken Grain	92	do.	do. do. do.	Wheat, maize, peas, shellgrit	9·0	1·5*	4·5				
18% Protein Antibiotic Vitamised Chick Starter Special C.P.	105	do.	do. do. do.	Bran, pollard, cereal meals, wheat germ, meat meal and/or whale meal, whale solubles and/or dried solubles, lucerne pollard, pea meal, bone flour and/or ground phosphate, oyster flour, riboflavin, procaine penicillin, micratized vitamins A and D3, nefco	18·0	2·5*	6·0	1·5 0·25*	3·0 1·0*	2·5 1·0*	
18% Protein Antibiotic Vitamised Chick Granules Special C.P.	104	do.	do. do. do.	do. do. do. do.	18·0	2·5*	6·0	1·5 0·25*	3·0 1·0*	2·5 1·0*	
20% Protein Vitamised Antibiotic Broiler Mash	112	do.	do. do. do.	Bran, pollard, grain meals, wheat germ, meat meal and/or whale meal, whale solubles, dried solubles, oyster flour, bone flour and/or ground phosphate, sodium chloride, micratized vitamins A and D3, riboflavin, nefco, procaine penicillin	20·0	2·0*	6·5	1·5 0·5*	3·5 1·0*	3·75 1·0*	
20% Protein Vitamised Antibiotic Broiler Granules	111	do.	do. do. do.	do. do. do. do.	20·0	2·0*	6·5	1·5 0·5*	3·5 1·0*	3·75 1·0*	....

No. 1 Chick Food ..	118	ANCHOR	G. Wood Son & Co. (W.A.) Pty., Ltd.	Peas, barley, wheat, maize, Enseed, whale meal, bone grit, fine shellgrit	16·0	1·5*	6·0	{ 0·2 0·02*	2·0 0·5*	6·0 2·0*
Chick Starter	38	MORLAY	Robert B. Young	Wheat meal, bran, dried yeast, whale meal, meat meal, bone meal, shellgrit, antibiotic concentrate, nefco concentrate, apac, manganese sulphate, and minerals	18·0	3·0*	5·5	{ 2·0 0·25*	3·5 1·0*	4·0 1·5*
Chick All Mash (Vitamin Fortified)	42	do.	do. do.	Wheat meal, bran, meat meal, whale meal, bone meal, oyster shellgrit, dried yeast, apac, nefco concentrate, manganese sulphate, and minerals	15·0	3·0*	6·0	{ 2·0 0·25*	3·0 1·0*	4·0 1·5*
Growing Mash	46	do.	do. do.	Wheat meal, bran, pollard, meat meal, whale meal, bone meal, oyster shell flour, dried yeast, malt sprouts, and minerals	14·0	3·0*	5·5	{ 2·0 0·25*	3·0 1·0*	4·0 1·5*
Growing Mash (Vitamin Fortified)	45	do.	do. do.	do. do. do. do.	14·0	3·0*	5·5	{ 2·0 0·25*	3·0 1·0*	4·0 1·5*
Chick Food	71	APEX	E. J. Fry Pty., Ltd.	Wheat, maize, peas, oats, shellgrit	10·0	3·0*	6·5	*nil*	*nil*	2·0*
Chick Starter (A and D3)	70	do. ...	do. do. do.	Bran, pollard, wheat meal, meat meal, bone meal, buttermilk, stabilised vitamins A and D3	17·0	3·0*	6·0	{ 1·0 0·25*	2·0 1·1*	3·0 1·5*
Growers' Mash (A and D3)	68	do.	do. do. do.	do. do. do. do.	15·0	3·0*	6·0	{ 1·0 0·25	2·0 1·1*	3·0 1·5*
Growers' Mash (8 weeks to maturity)	165	"CHECKER-MIX" GROWELL	Barrow, Linton & Co.	Bran, pollard, wheat meal, barley meal, ground oats, and "Checker-Mix" concentrate for growers	17·4	4·5	4·6	Trace	1·0	Trace
Chick Starter (day-old to 8 weeks)	164	"CHECKER-MIX" VITALIZER	do. do.	Bran, pollard, wheat meal, barley meal, ground oats, and "Checker-Mix" concentrate for chicks	20·0	4·3	4·4	Trace	1·0	Trace
6.—Pig Foods.										
Pig Food	62	EVE-LYN	Tropical Traders & Patersons, Ltd.	Gristed wheat, barley, rye, pollard, salt, limestone, chalk, sulphur, animal charcoal, sulphate of iron, limonite, copper sulphate (trace), ginger, coriander, areca nut, feemugreek	5·0	1·0*	5·0	{ 9·6 8·6*	3·75 3·25*	9·5 8·5*
Pig Mash	149	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, rolled wheat, meat meal and bone meal, limestone, copper	16·0	{ 7·0 5·0*	{ 8·0	{ 2·0 1·0*	3·5 2·3*	2·5 2·0*
18% Protein Antibiotic Vitamised Pig Starter	93	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Pollard, wheat germ, grain meals, meat meal and/or whale meal, dried whale solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, riboflavin, procaine penicillin, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate	18·0	2·5*	6·5	{ 2·0 1·0*	3·75 1·0*	4·0 1·0*
18% Protein Antibiotic Vitamised Pig Starter Pellets	94	do.	do. do. do.	Pollard, grain meals, meat meal and/or whale meal, dried solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate	18·0	2·5*	6·5	{ 2·0 1·0*	3·75 1·0*	4·0 1·0*

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis. Crude Protein. (Min.)	Crude Fat. (Max.)	Crude Fibre. (Max.)	Sodium Chloride (NaCl). (Max.)	Phosphoric Acid (P_2O_5). (Max.)	Calcium (Ca). (Max.)	Other.
					%	%	%	%	%	%	%
16% Protein Antibiotic Vitamised Pig Grower	95	do.	do. do. do.	Pollard, grain meals, meat meal and/or whale meal, dried solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, micratized vitamins A and D3, manganese sulphate, stabilised iodine, cobalt sulphate, procaine penicillin	16·0	2·5*	6·5	2·0 1·0*	3·5 1·0*	4·5 1·0*	
16% Protein Antibiotic Vitamised Pig Grower	96	do.	do. do. do.	do. do. do. do.	16·0	2·5*	6·5	2·0 1·0*	3·5 1·0*	4·5 1·0*	
14% Protein Pig Fattening mash	97	do.	do. do. do.	Pollard, grain meals, dried solubles, meat meal and/or whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	14·0	2·5*	6·0	2·0 1·0*	3·75 1·0*	4·0 1·0*	
14% Protein Pig Fattening Cubes	98	do.	do. do. do.	Pollard grain meal, whale meal and/or meat meal, dried solubles, whale solubles, bone flour and/or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iodine, cobalt sulphate	14·0	2·5*	6·5	2·0 1·0*	3·75 1·0*	4·0 1·0*	
Pig Mash	43	MORLAY	Robert B. Young	Cereal meals, pollard, meat meal, whale meal or whale solubles, limestone, and minerals	14·0	3·0*	6·0	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Pig Mash (Vitamin Fortified)	44	do.	do. do.	do. do. do. do.	14·0	3·0*	6·0	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Pig Mash H.P.	47	do.	do. do.	do. do. do. do.	17·0	3·0*	6·0	2·0 0·25*	3·0 1·0*	4·0 1·5*	
Pig Mash H.P. (Vitamin Fortified)	48	do.	do. do.	do. do. do. do.	17·0	3·0*	6·0	2·0 0·25*	3·0 1·0*	4·0 1·5*	
7.—Horse Foods.											
Horse Food	60	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, barley, wheat, rye, linseed (whole), salt, chalk, magnesium sulphate, sulphur, sulphate of iron, copper sulphate (trace), sodium bicarbonate, and medical herbs	8·5	3·0 2·0*	7·0	5·0 4·5*	1·0 0·5*	1·75 0·75*	Sulphur 1·25
12% Protein Sweet Horse Food	99	THOMAS	W. Thomas & Co. (W.A.) Ltd.	Mill offal, grain meals, molasses, brewers grains, malt combings, bone flour and or ground phosphate, oyster flour, sodium chloride, manganese sulphate, stabilised iordine, cobalt sulphate	12·0	1·5*	10·0	2·0 1·0*	2·5 1·0*	4·0 1·0*	
8.—Dog Food											
No. 1 Dog Biscuits	19	SNAPS	Snaps Dog Foods	Wheat, bone, meat, vegetables	15·0	5·0 4·0*	2·0	0·7 0·4*	4·5 3·0*	4·5 3·5*	Carbohydrates 82·0
Plain Shapes	20	do.	do. do.	do. do. do.	15·0	5·0 4·0*	2·0	0·7 0·4*	4·0 3·0*	4·0 3·0*	Carbohydrates 62·0

Charcoal Shapes	21	do.	do. do.	do. do. do.	14·0	5·0 3·0*	6·0	0·7 0·4*	3·0 2·0*	3·0 2·0*	Carbohydrates 62·0		
Puppy Meal	22	do.	do. do.	do. do. do.	15·0	6·0 5·0*	2·0	0·6 0·3*	4·0 3·0*	4·5 3·5*	Carbohydrates 62·0		
Dog and Cat Food	1	TUCKER BOX	Tucker Box Dog & Cat Food Co.	Meat and meat by-products, cereals, vegetables, salt	10·0	2·5*	0·5	1·0	. .	. .	. .		
20% Protein Kanine Kibbles	106	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Pre-digested cereal meals, wheat germ, grain meals, meat meals, milk powder, molasses, oyster flour, sodium chloride, potassium iodide, micratized vitamins A and D3, vitamin B1	20·0	1·0*	2·5	1·5 0·5*	2·5 0·5*	2·5 0·5*	....		
Dog Meal A, B (A and D3)	150	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, meat meal, dried yeast, buttermilk, bone meal, salt	20·0	8·0 4·0*	5·0	2·0 1·0*	2·5 1·0*	3·0 1·0*	..		
9.—*Miscellaneous.*											....		
Lin Meal	115	WESTERN	David Gray & Co., Ltd.	Malt grains, linseed meal, yeast, whale solubles, pollard, wheat cereals and trace elements, cobalt chloride, copper sulphate, manganese sulphate	20·0	5·0*	7·0	1·5 0·5*	1·5 0·5*	1·0 0·15*	....		
C.—Stock Licks.													CaO.
1.—*Bone Meal.*													
Bone Meal	6	ANCHO	Anchorage Butchers Pty.,	Waste meat products	23·63	2·44*	Trace	Trace	26·76*	26·96*	....		
Tri-Cal-Os Sterilised Bone Flour	8	TRI-CAL-OS	Davis Gelatine (Aust.) Pty., Ltd.	Bones	5·0				30·0*	40·0*	....		
Sterilised Bone Grit	9	do.	do. do. do.	do.	5·0	....	....	....	30·0*	40·0*	....		
Whale Bone Meal	13	WRIGHTS	Wrights, Ltd.	Whale bone	8·5	....	....	1·0	30·0*	28·0*	..		
Bone Meal	153	W.A.M.E.	West Australian Meat Export Works	Selected bones solely	18·75	....	....	0·25	26·04	27·04	..		
2.—*Oyster Flour.*													
Oyster Flour	100	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Oyster shell	....	....	....	1·0	*nil*	42·0*	..		
Dean's Oyster Flour	29	DEAN'S	J. Deane & Son	do.	....	....	....	0·5	Trace	50·0*	..		

Stock Food.	Reg. No.	Brand.	By Whom Registered.	Materials from which Made.	Registered Analysis.											
					Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Lime (CaO).	Magnesia (MgO).	Iron (Fe).	Sulphur (S).	Iodine (Cu).	Copper (I).	Cobalt (Co).	Manganese (Mn).	Potassium (K).	Zinc (Zn).
					% (Max.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.
3.—*Mixed Stock Licks.*																
Iodised Mineral Lick	66	DAYSON & HEWITT, LTD.	Boans, Ltd.	Calcium, phosphorous, sodium chloride, iron, sulphur, copper, manganese potassium, iodine, cobalt	83·7	1·05	5·5		1·5	1·0	0·125	0·08	0·002	0·02	0·39	....
Tra-ca-phene B	58	BLUE PETER	Agricultural Products Co.	Phenothiazine, ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	1·0	*nil*	32·0		2·9			1200 p.p.m.	225 p.p.m.	500 p.p.m.	..	..
Medicated Calcium	57	do.	do. do.	Ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	1·0	*nil*	45·0		3·5			1500 p.p.m.	285 p.p.m.	600 p.p.m.		
Medicated Salt Block B	59	do.	do. do.	Salt, ground limestone, limonite, copper carbonate, cobalt sulphate, manganese oxide	70·0	*nil*	6·0		1·5			550 p.p.m.	95 p.p.m.	200 p.p.m.		

* Minimum

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By Whom Registered.	Materials from which Made.	Registered Analysis.										
					Sodium Chloride ($NaCl$).	Phosphoric Acid (P_2O_5).	Lime (CaO).	Magnesia (MgO).	Iron (Fe).	Sulphur (S).	Iodine (I).	Copper (Cu).	Cobalt (Co).	Manganese (Mn).	Potassium (K_2O).	Zinc (Zn).
					% (Max.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% Min.	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% Min.
Denmark Cobalt Lick	7	C.S.M.L.	Cuming Smith & Mt. Lyell	Limonite, sulphate of copper, salt	38·0				20·0			0·14	20 p.p.m.			
Cattle Lick	151	WESFARMERS	Westralian Farmers Co-op., Ltd.	Cobalt, chloride, manganese sulphate, potassium iodide, bone meal, common salt, yeast, iron sulphate, copper sulphate, sulphur, zinc sulphate	80·0	1·0	5·0		1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Sheep Lick	152	do.	do. do.	do. do. do.	80·0	1·0	5·0		1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Concentrated Cattle Lick	122	VITA-LICK	Goldsbrough Mort & Co., Ltd.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, limonite, potassium iodide, copper sulphate, cobalt chloride	*nil*	28·2	36·1		3·5	0·45	0·034	0·2	0·42		0·45	
Concentrated "D"	123	do.	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), sulphur, limonite, potassium iodide	*nil*	30·0	38·75		1·25	2·0	0·034			0·045	
Concentrated "D" Cobaltised and Copperised)	124	do.	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), sulphur, limonite, potassium iodide, cobalt chloride, copper sulphate	*nil*	30·0	38·75		1·25	2·0	·034	0·2	0·014		
Concentrated "G"	125	do.	do.	do.	Bone flour (degelatinised), bone charcoal, limonite, flowers of sulphur, potassium iodide	*nil*	28·75	37·0		3·50	2·0	·034				
Concentrated "G" (Cobaltised and Copperised)	126	do.	do.	do.	Bone flour (degelatinised), bone charcoal, limonite, flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride	*nil*	28·75	37·0		3·50	2·0	0·034	0·2	0·014		
Mineral Supplement for Pigs	127	POR-CO-VITE	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, sodium chloride, limonite, calcium carbonate, copper sulphate, cobalt chloride, potassium iodide	14·0	19·14	29·32		0·62	9·6	0·052	0·1	0·003		
Concentrated Cattle Lick	49	VIC-LIC	Wilcox Mofflin, Ltd.	Precipitated bone, di-calcic, phosphate bone charcoal, iron limonite, salt, and potassium iodide	5·5	29·0	39·0		2·9							
Concentrated Sheep Lick	52	VIC-LIC D	do.	do.	Precipitated bone, di-calcic, phosphate bone charcoal, iron limonite, sodium sulphate, copper sulphate, cobalt chloride, potassium iodide	*nil*	30·0	41·0		2·9			0·75	0·031		
Do. do.	50	VIC-LIC G	do.	do.	Bone charcoal, iron limonite, potassium iodide, copper sulphate, cobalt	*nil*	28·0	37·0		5·8			0·7	0·07		
Mineralised Salt Block	51	VIC-LIC	do.	do.	Salt, bone charcoal, iron limonite, epsom salts, molasses, potassium iodide	58·0	4·5	19·5	0·16	1·25	...				...	

Cattle Lick	117	DAVID GRAY'S	David Gray & Co., Ltd.	Sodium chloride and various trace elements	80·0	1·0	5·0	.	1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
Sheep Lick	116	do.	do. do.	Sodium chloride and various trace elements, bone meal and yeast	80·0	1·0	5·0	.	1·2	3·3	150 p.p.m.	220 p.p.m.	92 p.p.m.	200 p.p.m.	50 p.p.m.	80 p.p.m.
					Sodium 70 p.p.m.		Calcium (Ca) 13·42									
Mineralised Supplement for Stock	17	RAWLEIGH'S	The W. T. Rawleigh Co., Ltd.	Salt, sulphur, copperas, sodium phosphate, potassium iodide, calcium carbonate, cobalt sulphate, defluorinated phosphate, mineral oil, molasses, and drug mixtures and drug mixtures	15·0	12·24	27·0	..	1000 p.p.m.	3·5	220 p.p.m.	..	10 p.p.m.	..	80 p.p.m.	....
Poultry Powder (Iodised)	16	do.	do. do.	Oyster shell, sulphur, potassium iodide, copperas (iodine sulsulphate), ground bone, manganese sulphate, copper sulphate, zinc sulphate, cobalt sulphate, quassia, defluorinated phosphate, mineral oil	16·5	38·0	....	....	400 p.p.m.	4·0	100 p.p.m.	40 p.p.m.	100 p.p.m.	120 p.p.m.	40 p.p.m.	100 p.p.m.
Watkins Mineral Food Supplement	2	WATKINS ...	The J. R. Watkins Co.	Di-calcic phosphate, micratized rock phosphate, calcium carbonate, ferric oxide, ferrous sulphate, ground sulphur, magnesium carbonate, magnesium sulphate, salt, potassium iodide, copper sulphate, Manganese sulphate, cobalt sulphate, zinc sulphate	9·0	15·5	32·0	0·7	1·1	....	0·0176	0·0129	0·01	0·009	....	0·011
					Glucose		Infr-Gent-Co-Conc.			Yeast					Maize Oil Meal	
Luff's Blue Label Stock Conditioner	3	LUFF'S BLUE LABEL	Stam Products ...	Yeast, maize oil meal, caramel, oil of aniseed, boric acid, thiammine, hydro-chloride, salts of iron, copper, manganese, zinc, cobalt, liquid glucose (45° BE), (vitamin B1, 29·700 IU /lb.)	74·8		2·67		1646 p.p.m.	1·78	55·3 p.p.m.	49·6 p.p.m.	50·7 p.p.m.		3·57	66·4 p.p.m.
Rock Salt	34	ELDER'S ...	Elder, Smith & Co., Ltd.	Sodium chloride, marl	95·0	.		....	.		....	. .			. .	. .
					Sodium Sulphate										Rice Meal	
Chick-A-Vite	156	CHICK-A-VITE	Goldsbrough, Mort & Co., Ltd.	Bone flour (degelitinised), bone charcoal, ferrous sulphate, flowers of sulphur, sodium sulphate (anhydrous), gentian, cod liver oil, potassium iodide, and meal derived from the by-products of rice	6·0	20·2	25·9	.	1·7	1·7					17·5	....
Mineral Lick . . .	120	MINDIF	R. Hoey Pty., Ltd.	Potassium iodide, bone flour, sulphur, sulphate of Potash, red oxide of iron, iron sulphate, limestone, gypsum, manganese sulphate, cobalt sulphate, copper sulphate	90·0	1·5	4·7		0·35	940 p.p.m.	850 p.p.m.	3000 p.p.m.	300 p.p.m.	850 p.p.m.	1680 p.p.m.	....
Mineral Supplement for Cattle	119	SUPER MINDIF	do. do.	Copper, cobalt, manganese, potassium iodide, sulphur, iron	30·0	26·4	24·0	. .	0·24	0·75	240 p.p.m.	1800 p.p.m.	300 p.p.m.	510 p.p.m.	..	....
Phosphate Flour	103	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Ground rock phosphate	...	36·6	42·0				...	. .	.	.	. .	....

* Minimum.

STOCK FOODS—continued

Stock Food.	Reg. No.	Brand.	By Whom Registered.	Materials from which Made.	Registered Analysis.										
					Sodium Chloride ($NaCl$).	Phosphoric Acid (P_2O_5).	Lime (CaO).	Magnesia (MgO).	Iron (Fe).	Sulphur (S).	Iodine (Cu).	Copper (I).	Cobalt (Co).	Manganese (Mn).	Potassium (K).	Zinc (Zn).
					% (Max.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)	% (Min.)
Min-A-Vit	159	BLACK BAND	Hamilcar Holdings Pty. Ltd.	Bone flour, calcium carbonate, manganese sulphate, iron oxide (Fe_2O_3), potassium iodide, sodium chloride, cobalt sulphate, copper sulphate, vitamin D3 (mineral stable)	15·0	27·0	40·0	Vitamin D3 6000 I.U per oz.	0·077	....	0·030	0·0025	0·002	0·42	Riboflavin 130 MG per lb. Min-a-Vit	
Do.	160	ORANGE BAND	do. do.	Bone dust, talc, whiting, salt (NaCl), molasses, copper sulphate, zinc sulphate, manganese sulphate, cobalt sulphate, potassium iodide, vitamin concentrate (mineral stable vitamin D3)	21·0	18·0	22·0	2·0	..	...	0·043	0·025	0·009	0·032	..	0·022
Do.	161	RED BAND	do. do.	Bone dust, talc, whiting, salt (NaCl), molasses, copper sulphate, zinc sulphate, manganese sulphate, cobalt sulphate, iron oxide (Fe_2O_3), potassium iodide, vitamin concentrate (mineral stable vitamin D3)	16·0	12·0	18·0	6·0	0·625	..	0·043	0·025	0·009	0·032	Protein 2·0	0·022
Do.	162	BLACK BAND plus Pack	do. do.	Bone flour, calcium carbonate, manganese sulphate, iron oxide (Fe_2O_3), potassium iodide, sodium chloride, cobalt sulphate, copper sulphate, vitamin A (mineral stable), vitamin D3 (mineral stable)	15·0	27·0	40·0	....	0·077	....	0·03	·0025 Riboflavin 130 mg. per lb. Min-A-Vit	0·002	0·42	Vitamin D3 6000 IU. per oz. Vitamin A 475 IU per gram.	
Bio Vigomin	170	BIO VIGOMIN	The Biological Institute of Australasia Pty., Ltd.	Malt flour, buttermilk powder, liver meal, charcoal, vitamin A (2,000,000 units), vitamin D3 (250,000 units)	1·25	30·0	25·6	....	0·75	1·90	Crude Protein 5·6		...	...	....	..
Bio DC	169	BIO DC	do. do.	Cobalt chloride, ferrous sulphate, calcium phosphate, magnesium phosphate, manganese chloride, copper sulphate, potassium iodide	*nil*	2·20	0·35	0·55	2·40	5·25	0·11	....	....	.	....	.
Bio Ovatine	168	BIO OVATINE	do. do.	Alstonia bark, ginger, foenugreek	...	.	....	7·30	5·87	. .	0·05	0·41	0·03	2·19	....	...

* Minimum.

ANALYSES OF FEEDING STUFFS

Results of Analyses of Samples of Stock Foods taken under the Feeding Stuffs Act, 1928-1948, Period 1/6/54 to 30/5/55.

(Published under Section 9 of the Act.)

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	Australian Whaling Commission.							
	"Australian Whaling Commission" Spray Dried Whale Solubles—							
	Registered Analysis	82·0†	0·4*	0·1*	2·0*	1·4*	1·3*	....
					1·4†	1·0†	1·0†	....
7–7–54	Sample Analysis	82·9	0·4	Trace	3·70	1·67	1·10	....
	"Australian Whaling Commission" Whale Meal—							
	Registered Analysis	60·0†	10·0*	1·0*	0·8*	10·5*	9·5*	....
					0·4†	8·5†	7·5†	....
7–7–54	Sample Analysis	59·6	8·0	0·9	0·72	12·8	7·4	....
	Cheynes Beach Whaling Co., Ltd.							
	"Cheynes Beach" Whale Meal—							
	Registered Analysis	60·0†	21·0*	1·0*	1·0*	1·5*	1·0*	....
					nil†	*nil*†	*nil*†	....
7–7–54	Sample Analysis	60·9	19·9	0·9	1·04	1·72	0·85	....
	West Australian Meat Export.							
	"W.A.M.E." Meat Meal—							
	Registered Analysis	45·0†	13·0*	2·0*	1·0*	12·0*	11·0*	....
					nil†	9·0†	6·0†	....
3–8–54	Sample Analysis	54·8	14·0	1·5	1·25	7·89	6·90	....
	Midland Junction Abattoir Board.							
	"Midland" Meat Meal—							
	Registered Analysis	52·0†	15·0*	2·0*	1·5*	6·0*	5·5*	....
					nil†	4·0†	3·5†	....
3–8–54	Sample Analysis	50·8	18·0	1·8	0·95	6·80	5·81	....
	David Gray & Co., Ltd.							
	"Western" Lin Meal—							
	Registered Analysis	18·0†	5·0†	7·5*	1·5*	1·5*	1·0*	....
					0·5†	0·5†	0·15†	....
3–8–54	Sample Analysis	18·6	6·8	5·8	4·0	1·10	0·14	....
	"Western" Calf Food—							
	Registered Analysis	18·0†	6·0†	7·5*	1·5*	1·5*	1·0*	....
					0·5†	0·5†	0·15†	....
3–8–54	Sample Analysis	18·6	7·0	6·0	2·81	1·15	0·15	....
	W. Thomas & Co. (W.A.) Ltd.							
	"Thomas" 18% Protein Antibiotic Chick Starter—							
	Registered Analysis	18·0†	2·5†	6·0*	1·5*	3·0*	2·5*	....
					0·25†	1·0†	1·0†	....
29–7–54	Sample Analysis	19·8	3·9	3·8	0·23	2·30	1·94	....
	Westralian Farmers Co-op. Ltd.							
	"Wesfarmers" Sweetened Dairy Meal—							
	Registered Analysis	16·0†	2·5†	10·0*	3·5*	3·5*	2·5*	....
					2·0†	2·3†	2·0†	....
28–7–54	Sample Analysis	17·2	4·5	9·4	1·52	1·73	1·44	....
	"Wesfarmers" Calf Meal—							
	Registered Analysis	18·0†	4·0†	7.0*	1·0*	3·5*	2·0*	....
					nil†	2·3	1·5†	....
28–7–54	Sample Analysis	16·4	5·7	6·2	1·28	1·78	1·28	....
	Barrow Linton & Co.							
	"Grow-Well" Growing Mash—							
	Registered Analysis	15·0†	3·5†	5·0*	1·0*	3·0*	3·5*	....
					0·75†	2·5†	3·0†	....
28–7–54	Sample Analysis	15·3	3·5	4·5	0·52	2·57	2·67	....
	"Vitalizer" Starter Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0*	3·0*	3·5*	....
					0·75†	2·5†	3·0†	....
28–7–54	Sample Analysis	16·9	4·3	4·6	0·88	3·32	4·0	....

* Maximum. † Minimum.

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	Tropical Traders & Patersons. Ltd.							Sulphur (S)
	"Eve-Lyn" Pig Food—							
	Registered Analysis	5·0†	1·0†	5·0*	9·6*	3·75*	9·5*	3·25*
					8·6†	3·25†	8·5†	....
28–7–54	Sample Analysis	6·5	3·5	4·5	9·23	5·95	8·67	3·51
	"Eve-Lyn" Horse Food—							Sulphur (S)
	Registered Analysis	8·5†	2·0†	7·0*	5·5*	1·0*	1·75*	....
					4·5†	0·5†	0·75†	1·25*
28–7–54	Sample Analysis	9·6	3·0	3·6	5·05	0·55	0·95	1·71
	Agricultural Products Co.	Iron (Fe).	Lime (CaO).			Copper (Cu). p.p.m.	Cobalt (Co.). p.p.m.	Manganese (Mn). p.p.m.
	"Blue Peter" Medicated Calcium—							
	Registered Analysis	3·5†	45·0†	....	1·0*	1500	285	600
8–9–54	Sample Analysis	3·79	45·3	....	0·96	1960	360	600
	W. Thomas & Co. (W.A.), Ltd.							
	"Thomas" 18% Protein Antibiotic Vitamised Chick Starter—							
	Registered Analysis	18·0†	2·5†	6·0*	1·5*	3·0*	2·5*	....
					0·25†	1·0†	1·0†	....
8–9–54	Sample Analysis	19·4	3·5	3·3	1·41	2·0	2·56	....
	C. A. Kirkby & Sons.							
	"K.B." Laying Mash—							
	Registered Analysis	18·0†	3·5†	7·0*	2·0*	4·0*	5·0*	....
					0·25†	1·2†	1·9†	....
19–8–54	Sample Analysis	19·2	4·0	4·3	0·34	3·50	4·68	....
	W. Thomas & Co. (W.A.), Ltd.							
	"Thomas" 16% Protein Laying Mash No. 1—							
	Registered Analysis	16·0†	2·5†	6·0*	2·0*	3·5*	3·75*	....
					0·5†	1·0†	1·0†	....
19–8–54	Sample Analysis	16·5	3·1	6·4	1·01	1·57	1·98	....
	South-West Co-op. Dairy Farmers, Ltd.							
	"Sunny West" Dried Buttermilk Powder—							
	Registered Analysis	29·0†	11·0*	0·5*	3·0*	2·5*	1·5*	....
			2·0†		1·0†	1·5†	0·5†	....
22–9–54	Sample Analysis	29·7	6·4	0·4	1·6	2·18	1·12	....
	Nor'-West Whaling Co., Ltd.							
	"N.W.W." Whale Meal—							
	Registered Analysis	58·0†	8·0*	1·0*	0·4*	13·0*	12·0*	....
					0·2†	9·0†	8·0†	....
22–9–54	Sample Analysis	59·4	3·7	0·8	0·99	10·4	9·34	....
	W. Thomas & Co. (W.A.), Ltd.							
	"Thomas" 16% Protein Laying Mash No. 1—							
	Registered Analysis	16·0†	2·5†	6·0*	2·0*	3·5*	3·75*	....
					0·5†	1·0†	1·0†	....
22–9–54	Sample Analysis	16·8	4·4	6·0	0·56	2·32	2·36	....
	Westralian Farmers Co., Ltd.							
	"Red Comb" Laying Pellets No. 1—							
	Registered Analysis	16·0†	4·0†	7·0*	1·0*	3·5*	2·5*	....
					nil†	2·3†	2·0†	....
22–9–54	Sample Analysis	17·0	3·9	6·6	0·32	2·35	2·2	....
	Maylands Milling Co. Pty., Ltd.							
	"Mayco" Special Laying Mash—							
	Registered Analysis	17·0†	3·5†	5·0*	1·0*	3·0*	3·5*	....
					0·75†	2·5†	3·0†	....
22–9–54	Sample Analysis	16·4	4·0	5·2	0·81	2·63	2·86	....
	Australian Whaling Commission.							
	"Australian Whaling Commission" Whale Meal—							
	Registered Analysis	60·0†	10·0*	1·0*	0·8*	10·5*	9·5*	....
					0·4†	8·5†	7·5†	....
21–9–54	Sample Analysis	57·8	12·2	1·0	0·57	8·96	8·29	....
	R. B. Young.							
	"Morlay" Pig Mash (Standard)—							
	Registered Analysis	14·0†	3·0†	6·0*	2·0*	3·0*	4·0*	....
					0·75†	1·0†	2·0†	....
30–9–54	Sample Analysis	15·9	2·2	3·0	0·30	1·51	1·89	....

* Maximum. † Minimum.

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	"Morlay" H.P. Laying Mash—							
	Registered Analysis	20·0†	3·0†	5·5*	2·0* 0·75†	3·5* 1·0†	4·0* 2·0†	....
30–9–55	Sample Analysis	20·3	3·8	4·5	0·33	3·0	3·81	....
	"Morlay" Pig Mash H.P.—							
	Registered Analysis	17·0†	3·0†	6·0*	2·0* 0·75†	3·5* 1·0†	4·0* 2·0†	....
30–9–54	Sample Analysis	19·5	2·9	2·6	0·38	1·77	1·96	....
	Westralian Farmers Co-op., Ltd.							
	"Wesfarmers" Chick Mash A—							
	Registered Analysis	16·0†	3·0†	7·0*	1·0* *nil*†	2·3* 1·2†	1·3* 0·8†	....
28–9–54	Sample Analysis	16·7	3·4	5·5	0·29	2·59	1·73	....
	"Wesfarmers" Chick Mash B—							
	Registered Analysis	15·0†	3·0†	7·0*	1·0* *nil*†	2·3* 1·2†	1·3* 0·8†	....
28–9–54	Sample Analysis	15·0	3·0	5·4	0·27	2·15	1·39	....
	South-West Co-op. Dairy Farmers, Ltd.							
	"Sunny West" Dried Buttermilk Powder—							
	Registered Analysis	29·0†	11·0* 2·0†	0·5*	3·0* 1·0†	2·5* 1·5†	1·5* 0·5†	....
26–10–54	Sample Analysis	30·1	8·3	0·1	1·78	2·0	1·05	
	Wright's, Ltd.						Lime (CaO)	
	"Wright's" Whale Bone Meal—							
	Registered Analysis	8·5†	....	....	1·0	30·0†	28·0†	....
26–10–54	Sample Analysis	12·2	....	....	0·6	24·6	32·4	....
	West Australian Meat Export Works.							
	"W.A.M.E." Meat Meal—							
	Registered Analysis	45·0†	13·0*	2·0*	1·0* *nil*†	12·0* 9·0†	11·0* 6·0†	....
26–10–54	Sample Analysis	53·6	12·2	1·4	1·78	8·22	7·3	....
	David Gray & Co., Ltd.							
	"Western" Calf Food—							
	Registered Analysis	18·0†	6·0†	7·5*	1·5* 0·5†	1·5* 0·5†	1·0* 0·15†	....
20–1–55	Sample Analysis	18·7	8·9	5·9	1·18	1·09	0·54	....
	W. Thomas & Co. (W.A.), Ltd.							
	"Thomas" 16% Protein Sweet Dairy Food—							
	Registered Analysis	16·0†	1·5†	10·0*	2·0* 1·0† Manganese (Mn) p.p.m. 60 83	2·5* 1·0† Cobalt (Co) p.p.m. 3 0·4	4·0* 1·0†	....
20–1–55	Sample Analysis	18·8	3·2	6·5	1·34	2·4	3·3	....
	South-West Stock Food Co.							
	"Linmix" Dairy Meal—							
	Registered Analysis	11·9†	8·2*	14·1*	....	....	....	....
20–1–55	Sample Analysis	11·2	5·4	12·1	....	....	....	....
	Westralian Farmers Co-op., Ltd.							
	"Wesfarmers" Sweetened Dairy Meal—							
	Registered Analysis	16·0†	2·5†	10·0*	3·5* 2·0†	3·5* 2·3†	2·5* 2·0†	....
20–10–54	Sample Analysis	18·0	3·7	10·3	1·89	1·03	0·81	....
	Cheynes Beach Whaling Co., Ltd.							
	"Cheynes Beach" Whale Meal—							
	Registered Analysis	60·0†	21·0*	1·0*	1·0* *nil*†	1·5* *nil*†	1·0* *nil*†	....
20–10–54	Sample Analysis	60·8	18·7	0·2	1·02	2·3	1·33	....
	Australian Whaling Commission.							
	"Australian Whaling Commission" Whale Meal—							
	Registered Analysis	60·0†	10·0*	1·0*	0·8* 0·4†	10·5* 8·5†	9·5* 7·5†	....
20–10–54	Sample Analysis	57·0	10·8	0·4	0·56	9·17	8·13	....

* Maximum. † Minimum.

Date Sample Taken.	Firm and Brand.	Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride (NaCl).	Phosphoric Acid (P_2O_5).	Calcium (Ca).	Other.
		%	%	%	%	%	%	%
	W. Thomas & Co. (W.A.) Ltd.							
	"Thomas" 16% Protein Sweet Dairy Food—							
	Registered Analysis	16·0†	1·5†	10·0*	2·0* 1·0†	2·5* 1·0†	4·0* 1·0†	....
20–10–54	Sample Analysis	16·4	3·2	7·1	1·7	2·07	2·33	....
					Cobalt (Co) p.p.m.	Manganese (Mn) p.p.m.	Iodine p.p.m.	
					3	60	60	
					(Co) 0·4	(Mn) 87		
	"Thomas" 20% Protein Laying Mash—							
	Registered Analysis	20·0†	2·5†	6·0*	1·5* 0·5†	3·5* 1·0†	3·75* 1·0†	....
19–10–54	Sample Analysis	20·6	3·6	5·6	0·54	2·97	2·88	....
	"Thomas" 15% Protein Chick Grower—							
	Registered Analysis	15·0†	2·5†	6·0*	1·25* 0·5†	3·5* 1·0†	3·75* 0·5†	....
19–10–54	Sample Analysis	15·6	3·1	5·1	0·57	1·9	2·25	....
	Midland Junction Abattoir Board.							
	"Midland" Meat Meal—							
	Registered Analysis	50·0†	18·0*	2·0*	1·5* *nil**	6·0* 4·0*	5·5* 3·5*	....
10–2–55	Sample Analysis	47·6	21·1	2·3	0·93	5·85	4·85	....

* Maximum. † Minimum.

DOMESTIC FIREPLACES AND CHIMNEYS

An efficient chimney is an essential part of nearly every Australian dwelling and requires careful attention to its construction. It serves two main purposes: to produce sufficient draught to regulate the burning of the fire, and to remove smoke and gases. It incidentally provides ventilation in the room.

The principles on which the chimney works are well known. Heated air from the fire expands, and being lighter than the surrounding colder air rises, forming a current which takes the smoke and gases with it. As too great a draught would cause rapid consumption of the fuel, provision is made to limit the draught by means of a throat—the junction of flue and the fireplace opening. The second main problem is that of returning smoke. This is prevented by good design, and allowances for pressure areas within and around the building.

Although little specific research has been done on the subject, various authorities have made recommendations after examining efficient structures in the light of present-day knowledge of aerodynamics. These relate to such aspects as site conditions, plan arrangements, and typical dimensions for fireplace opening and depth, throat, smoke shelf and flue.

The following illustrated publications from research bodies are available from the Building Research Liaison Service, Box 2807AA, Melbourne:—

"Domestic Fireplaces and Chimneys"—Notes on the Science of Building SB 31, published by the C.E.B.S. Price, 9d.

"Smokey Chimneys"—B.R.S. Digest No. 18 and "Condensation in Domestic Chimneys"—B.R.S. Digest No. 60. Price, 6d. each.

SB 31 (only) may be obtained from the Commonwealth Experimental Building Station, Box 30, Chatswood, N.S.W.

All prices include postage.

COWS SWEAT AFTER ALL

The widely-held belief that cattle do not sweat has now been exploded by C.S.I.R.O. scientists in Sydney.

Cattlemen and scientists have thought that unlike other mammals, cattle did not sweat in hot weather.

The Sydney research workers decided to settle the matter by actual test. They were anxious to discover the important factors in breeding cattle for our hot northern regions.

They compared a pure-bred Ayrshire calf with two Zebu-cross calves. The animals were kept in a hot box and a small, shaved area of the coat examined for traces of sweat. All three calves produced beads of sweat.

The Zebu-cross calves produced about four times more sweat than the pure British breed.

The Zebu-cross calves kept their temperature normal at 102°F. when in a hot box at 115°F. The temperature of the pure-bred British calf rose to 105°F. under the same conditions and it showed signs of heat distress. It seems likely that the greater amount of sweat produced by the Zebu-cross calves helped them adjust satisfactorily to the hot environment.